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The American City

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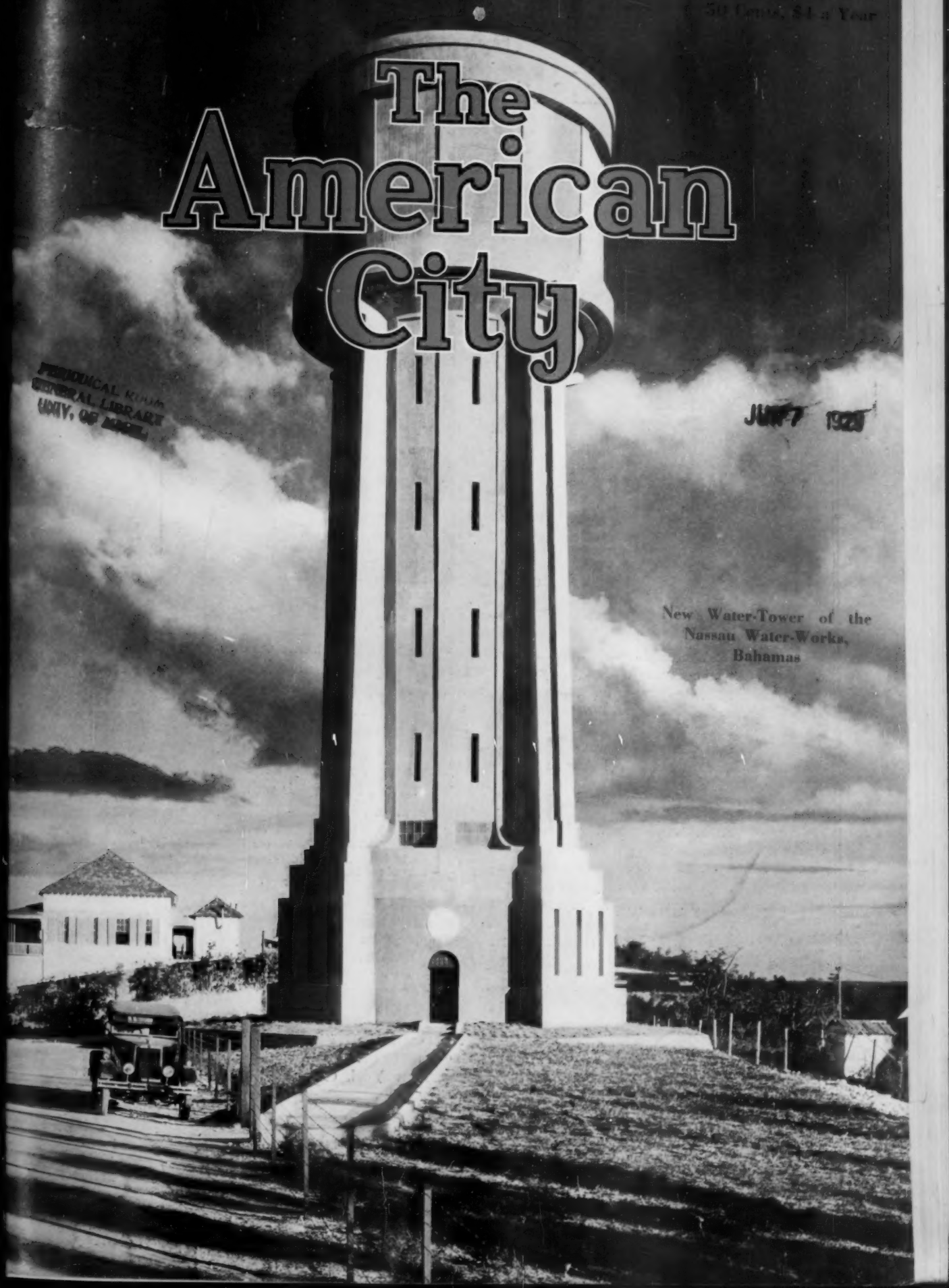

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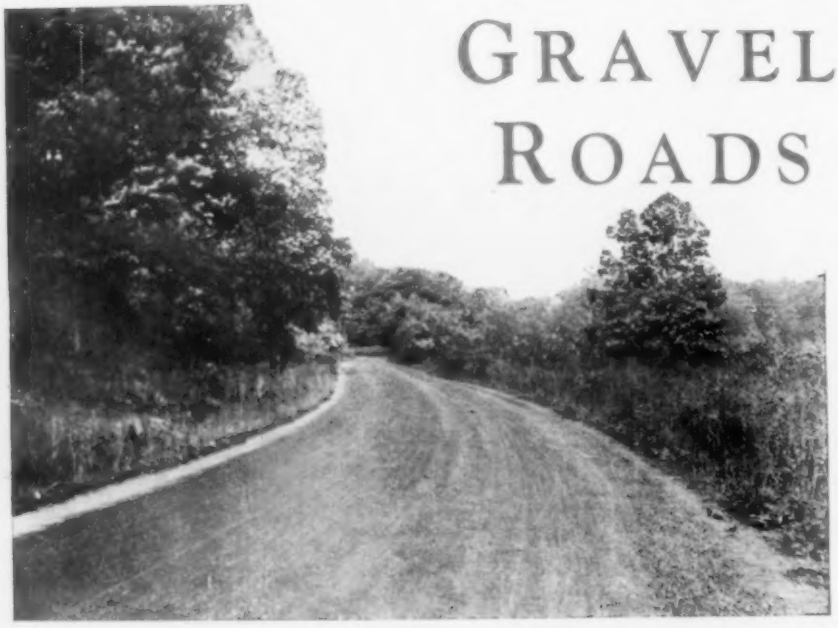

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The offices of THE AMERICAN CITY are headquarters for information on equipment for municipal and county work. If you want catalogs, prices or names of manufacturers, write or wire our main office in New York.

In addition to what is published in THE AMERICAN CITY, other material, including articles, lists and bibliographies on a wide variety of municipal and civic subjects, appear each year in

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Edition of 1929 now ready, 786 pages

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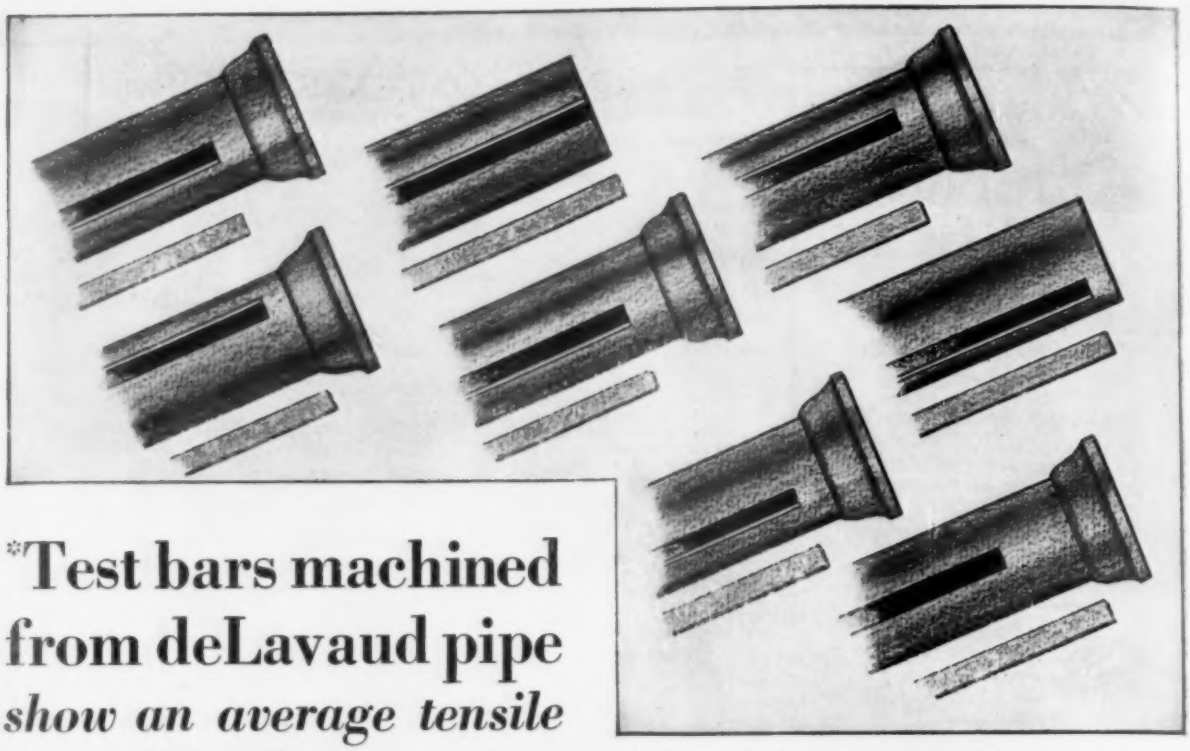

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Items and Abstracts *for* MAYORS AND CITY MANAGERS

New Headquarters and Secretary for City Managers' Association

THE International City Managers' Association moves its headquarters at the beginning of this month from Lawrence, Kansas, to an office adjacent to the campus of the University of Chicago, and furnished by the university, at 923 East 60th St., Chicago, Ill. At that time Clarence E. Ridley succeeds John G. Stutz as Executive Secretary of the International City Managers' Association and Editor of *Public Management*. He will also become Associate Professor of Political Science at the University of Chicago, and will give part time to university teaching and research.

Mr. Ridley was at one time vice-president of the association and has been active in its affairs for the past eight years. His academic training has been varied and interspersed with periods of active administrative service in various cities, including four years as a city manager. Degrees were granted Mr. Ridley from the University of Michigan in 1914, Columbia University in 1921, and the School of Citizenship and Public Affairs, Syracuse University, in 1927. For the past two years he has been a staff member of the National Institute of Public Administration, New York City, from which position he has resigned.

Mr. Stutz, who has served the association so well as secretary for the past six and one-half years, resigns in order to devote his full time to the Kansas League of Municipalities, of which he has been part-time secretary for many years.

The Bureau of Public Personnel Administration, of which Fred Telford is Director, is also to affiliate with the University of Chicago; and August Vollmer, well-known chief of the Police Department of Berkeley, Calif., has been appointed Professor of Police Administration at the University of Chicago.

872 Cities Report Recreation Programs, Supervised and Equipped

THE 1929 Year Book of *The Playground*, official publication of the Playground and Recreation Association of America (issue of May) constitutes a report of progress gratifying to advocates of the movement. A record-breaking total of 872 cities is shown to have conducted community recreation programs under leadership and with facilities during 1928.

One of the notable features of the report is the greatly increased municipal support of public recreation shown. Although community programs of recreation in 292 cities are shown to have been financed partially or wholly by private funds, the Association is able to report that of all funds expended, approximately 90 per cent was derived from municipal sources. of the remaining ten per cent practically twice as much money came from fees and charges for the use of facilities as from private sources.

Among other highlight facts and figures from the Year Book are these:

758 play areas were opened for the first time during 1928
12,159 separate play areas were reported; also
6,930 outdoor playgrounds
2,693 indoor recreation centers
3,303 baseball fields
7,186 tennis courts
937 swimming pools
353 bathing beaches, and
267 municipal golf courses.

A total of 20,762 employed workers was reported, and a total of 5,276 volunteers.

A Dollar-a-Year City Manager with a $12,000 Assistant

THE city government critic has come into power in Grand Rapids, Mich., and has been given the opportunity to demonstrate the logic of his criticisms.

George W. Welsh, former Lieutenant-Governor of Michigan, eight years a member of the Legislature, two years speaker of the Michigan House of Representatives, and publisher of the *Grand Rapids Chronicle*, so-called radical weekly newspaper, was appointed City Manager of Grand Rapids May 6, succeeding Fred H. Locke, resigned.

Appointment of the new manager was by a four to three vote of a new city commission. In the minority was Mayor Elvin Swarthout, a devout Methodist, who made a single statement after the commission session: "I am going home to pray."

The new manager announced immediately after his appointment that he would serve for $1 a year. The commission had voted the $1 a year, then reconsidered and fixed the salary at $12,000, an increase of $4,000 over that received by Mr. Locke. The outstanding event of the first week under the new regime was the appointment of George H. Waring, of Grand Rapids, consulting gas engineer, as Assistant City Manager, to receive the $12,000 salary which Mr. Welsh rejected.

Maps Used by New York Municipalities

WHILE sewer, water-main and paving maps are in fairly general use among the cities and villages of New York State only a small proportion of these communities have either official city planning or aerial maps, it is revealed in a survey by the State Bureau of Municipal Information.

Fifty-one cities and villages of that state have complete sewer maps as against only 13 which do not, and of those lacking such a map, two are preparing maps. Only 9 of the communities do not possess a complete water-main map, and one of these is preparing such a map. As for paving maps, 30 of the cities and villages replying have such a map and 32 do not, with one of this latter group now preparing this type of map.

Only 16 of the places included in the survey have adopted an official map as authorized by the planning law. In practically every instance, this map has been prepared by the city or village engineer, with or without the assistance of the planning commission.

Just a dozen communities now possess complete aerial maps, but this group includes several of the small communities as well as such large cities as Albany, Brooklyn, Buffalo, New York, Syracuse and Yonkers.

City Administrators

will find articles particularly worth their notice on pages 96, 123, 140, 144, 145, 159 and 167, as well as the unusual number of articles on water-supply matters, listed on page 3.

A Million Dollars' Worth of Ideas on City and Regional Planning

Under this heading* THE AMERICAN CITY *will publish, as the leading feature of next month's issue, some of the outstanding recommendations, of nation-wide or world-wide interest, of the Regional Plan of New York and Its Environs. More than $1,000,000 of funds of the Russell Sage Foundation and seven years of organization, fact-finding and compilation have gone into this, the most comprehensive program of regional planning ever proposed.

As the present issue of this magazine is being printed, a notable meeting is being held* (May 27), *in the Engineering Societies Building, New York, for a public presentation of the plan, and announcement is made of the formation of a new body, The Regional Plan Association, Inc., to make the plan effective. Because of the amount of space which the newspapers in the metropolitan district will be devoting to the definite proposals for rapid transit, regional highways, parks, parkways, landing fields and other features of special interest to the New York region,* THE AMERICAN CITY *will not attempt to cover these subjects in detail.

The article to appear in the July number will summarize some of the most important principles applicable to city and regional planning generally which are to be emphasized in the forthcoming "Atlas and Description of the Graphic Regional Plan." And all readers desiring to profit fully by the tremendous expenditure of money and ability which have gone into this undertaking are urged to secure the complete set of ten volumes and maps whose publication is now nearing completion, and which are obtainable, while the limited edition lasts, at $50 per set, from the Regional Plan of New York and Its Environs, 130 East 22nd Street, New York.

North of the Great Lakes

MEMBERS of the American Water Works Association traveling to the Convention in Toronto this month will find Horton Tanks on both sides of the border just as they found them last year on the Pacific Coast. Horton Tanks and other plate work for Canadian locations are fabricated at Bridgeburg, Ontario.

As an example of big municipal elevated storage tanks, note the illustration of the million gallon tank at Kitchener, about 65 miles west of Toronto. This big tank serves a city of 27,000 population. The water department in this case, as in scores of others, has found the use of adequate elevated storage a great advantage, readily appreciated by the public.

The 17th Horton elevated steel tank of 1,000,000-gallon capacity or over has just been completed. The practical value of such storage has been conclusively proved. Our representatives will gladly help you determine how much elevated storage you can use advantageously and give you cost estimates on tanks of any size. Address our nearest office.

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Items and Abstracts *on* WATER AND SEWERAGE

Water Softening by the Zeolite Method

AN effective method of softening water is that known as zeolite treatment, or base exchange, which consists of passing the water through a filter containing zeolite sand instead of silica sand as in ordinary filters. Zeolites are compounds of aluminum, silica and sodium or potassium which occur in nature or can be prepared artificially. They possess the property of being able to exchange their bases for others with which they come in contact. Thus, for example, when water containing calcium carbonate is passed through a bed of zeolite, the calcium is retained and the sodium of the zeolite is substituted for it, the effluent containing sodium carbonate instead of calcium carbonate. Any type of hardness, calcium or magnesium, temporary or permanent, can be removed by this process.

When the base exchange power of the material becomes exhausted, the filter is removed from service and the process reversed. A solution of common salt, which is sodium chloride, is passed through the beds, the sodium being retained by the zeolite, and the calcium or magnesium liberated, the latter flowing to waste with the spent salt solution. The filter is then ready for service again.

There are a number of base exchange materials on the market, such as permutit, doucil, kenzelite, etc., which differ in chemical and physical structure, but the principle of their action is the same in each case. The amount of salt required for regeneration varies somewhat but is usually one-third to one-half pound per 1,000 grains of hardness removed.

A water of practically zero hardness can be produced by this method, but, as in the case of removal of permanent hardness with soda ash, the content of total solids is increased to a certain extent. The high concentration of sodium salts in the treated water, which is directly proportional to the original hardness, may be objectionable in some cases, as these salts are believed to be a contributary cause of foaming in boilers. Any impurity, such as suspended matter, oil, iron, etc., which would tend to form a deposit or film on the zeolite grains must be removed before this method can be applied.

Abstract of a portion of a paper by Rudolph E. Thompson, Assistant Chemist and Bacteriologist, Filtration Plant, Toronto, Ont., presented before the Canadian Section of the American Water Works Association.

Cleveland's Metropolitan Water Problem

CLEVELAND and Cuyahoga County have, in Lake Erie, an excellent water-supply. Their public water service, however, while adequate for the city and the larger suburbs, is inadequate to meet the rapidly growing demand for fire, domestic and industrial purposes throughout the county. Metropolitan Cleveland is dependent upon two lake tunnels of 165,000,000 gallons daily capacity each. The four-tunnel, four-plant system of the metropolitan area adopted eight years ago is behind schedule. Expenditure of $50,000,000 will be necessary during the next ten years for lake tunnels, pumping-stations, water filtration plants, reservoirs and mains, and for the treatment, disposal and control of sewage and trades wastes. Progressive Greater Cleveland demands the completion of the Nottingham unit by the end of 1932, and the Western unit by 1938.

The main objective during these ten years should be the creation of a real metropolitan water system controlled and operated under one head. The present system, involving some 45 separate political subdivisions within Cuyahoga County, is wholly inconsistent with sound administration, good business and engineering coordination, according to Howell Wright, Director of Public Utilities, city of Cleveland. The water service of a population of one-and-a-half million people should not be subject to imaginary boundary lines, duplication of planning, and the inevitable resulting differences of opinion of city, county, village and township officials.

The Language of Sewage Disposal

ANY one who ardently desires to learn what is a squeegee, a wing screen, or a Dortmund tank, or to familiarize himself with any of the other many terms which public health engineers employ in dealing with sewage disposal, may now secure a dictionary of the words used. This glossary has been issued by the American Society of Civil Engineers, of New York, as a joint report by committees of the Society and the American Public Health Association.

These definitions, which now require more than 15 printed pages, have been accumulating since 1916, when the Sanitary Engineering Section of the American Public Health Association designated its first committee to consider the proposition. From a meager list of only 97 titles, the glossary has grown until now it contains more than 300.

An Unusual Water Famine Overcome

A WATER famine caused by conditions probably unparalleled in water-supply annals in New York State, occurred recently at Fort Ann, according to *Health News*, published by the New York State Department of Health. During the latter part of the first week of March, the level of the Champlain Barge Canal near Fort Ann was drawn down to allow for the placing of a new water-main across the canal to Great Meadow Prison. Halfway Brook, a canal feeder from which the public water-supply of Fort Ann is obtained, at a point a short distance from the canal, was drawn down simultaneously. Since this creek drains into the canal, the level of the water in the creek so fell that by Sunday, March 9, the pumps supplying the village of Fort Ann with water could no longer obtain suction. The storage supply was quickly exhausted and by noon of that day the village mains went dry. The State Department of Health was notified, and two members of the staff of the Division of Sanitation were sent to attend a conference held at Fort Ann the following day with the Mayor, Health Officer and Village Trustees. A supply sufficient for a few hours was obtained by rigging a small pipe line to the lower level, but it was evident that emergency measures were necessary.

It was proposed to hold back the waters of the creek by the construction of a temporary dam below the intake, but sufficient labor to do this quickly was not available in the village. The warden of the prison was appealed to for convict labor, but was unable to comply, as the New York State law does not permit the use of prisoners for such work.

On March 11 the problem was discussed at a conference with the town authorities, the Division of Sanitation, the Commissioner of Prisons, the Commissioner of Public Works and a Deputy Attorney-General. It was felt that but one man, the Governor, had the power to order the use of prison labor. At the united request of all concerned, the Governor so ordered, with the result that a serious health menace and fire hazard was quickly overcome by the construction of a temporary earth dam by prison labor. It is proposed to construct later, when the weather is more favorable, a new suction line at a level that will furnish water at all times.

Sizes of Water-Main in Lansing, and Cost of Installation

IN the Annual Report of the Water Department, Lansing, Mich., L. E. Hackett, Supt., gives some interesting data on the number of feet of different sizes of main and the cost of installation, as follows:

	Feet
24-inch mains	1,500
16-inch mains	15,620
14-inch	10,025
12-inch	53,146
10-inch	4,429
8-inch	41,817
6-inch	632,769
4-inch	69,496
3-inch	3,803
2-inch	3,085
1½-inch	340
1¼-inch	2,145
1-inch	35
¾-inch	812
Total	838,672

In the analysis of the cost of installing 6-inch water-main, the figures are based on the installation of 15,563 feet. The average cost per foot for main was 86.21 cents, for labor 23.51 cents, and miscellaneous charges 17.6 cents.

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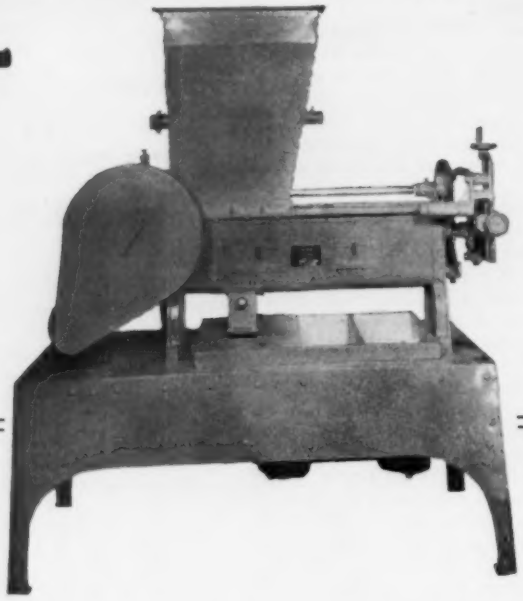

FOR FEEDING ANY DRY MATERIAL IN A CONTINUOUS AND UNIFORM STREAM.

Consider these points:

All-metal construction—Feeders have two cast-iron ends and galvanized iron body. Conveyors are made up of galvanized cast-iron or bronze flights. Ratchet wheels are of cast iron with cut teeth and cast steel pawls.

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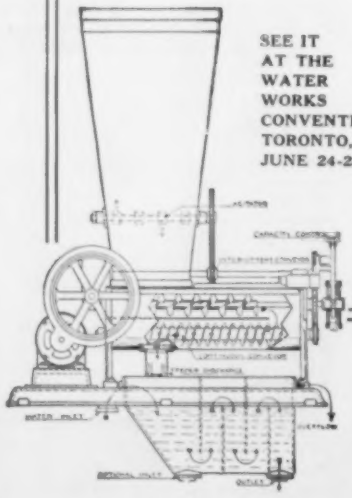
Accurate adjustment in the flow of material being fed—The Gaunt Dry Feeder is adjustable from the minimum to the maximum capacity while the machine is in operation, accurate adjustment being accomplished by means of our patented Variable Speed Mechanism.



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HEBER K. BURTON
Supt., Water Works
Salt Lake City, Utah
(Appointed 1919)

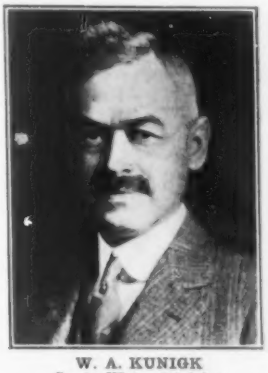
WILLIAM B. SEVERYNS
Supt., Water Department
Seattle, Wash.
(Appointed 1928)

ALEXANDER LINDSAY
Supt., Water Department
Spokane, Wash.
(Appointed 1910)

CARL A. McCLAIN
Supt., Water Board
Eugene, Ore.
(Appointed 1918)

WHO'S WHO IN WATER SUPPLY

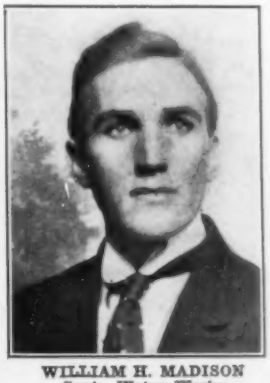
Installment No. 18—Portraits of Water-Works Officials of Fourteen Cities in Four States



W. A. KUNIGK
Supt., Water Division
Tacoma, Wash.
(Appointed 1917)

FRED J. SHARKEY
Supt., Water Department
Wenatchee, Wash.
(Appointed 1925)

JOHN D. GOLLAHER
Manager, Water Works
Tooele, Utah
(Appointed 1922)



WILLIAM H. MADISON
Supt., Water Works
Payson, Utah
(Appointed 1928)

FRANK C. DILLARD
Mgr., Water Commission
Medford, Ore.
(Appointed 1926)

E. L. STRANGE
Supt., Water Works
Corvallis, Oregon
(Appointed 1911)

WALTER R. BRACKEN
Vice-Pres., Las Vegas Land &
Water Co., Las Vegas, Nev.
(Appointed 1906)

CHARLES F. WILSON
Supt., Water Works
Yakima, Wash.
(Appointed 1926)

SAM G. WATKINS
Supt., Water Department
Aberdeen, Wash.
(Appointed 1920)

on the HOOVER RANCH

POSO LAND AND PRODUCTS COMPANY

HOOVER FARM
WASCO, KERN COUNTY
CALIFORNIA

November 1, 19

Byron Jackson Pump Co.,
Visalia, California.

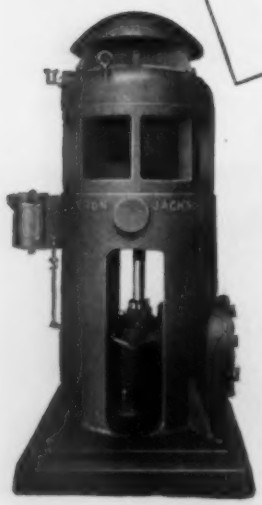
Gentlemen:

The pumps installed on the Hoover Farm in 1921 are still in good repair and according to a test made some days ago by the San Joaquin Light and Power Co. they are still operating efficiently. These plants have operated practically 24 hours a day from January 1 of each year till about the first of September.

We have had very little trouble with these plants and I believe they will run for some seasons yet without many repairs.

Very truly yours,

Harvey M. Kilburn, Mgr.



Byron Jackson Deepwell Turbine Pumps were selected for the California ranch of Herbert Hoover because of their guaranteed high efficiency and long established reliability. The accompanying letter is evidence that these pumps have justified the confidence imposed in them.

SINCE 1872

BYRON JACKSON CO.

Factories: BERKELEY, Los Angeles, Visalia, Calif.
Branches: NEW YORK and CHICAGO
San Francisco, Portland, Salt Lake, Tulsa, Dallas, Phoenix

BYRON JACKSON

CENTRIFUGAL PUMPS FOR EVERY SERVICE

During June we hope you will remember to mention THE AMERICAN CITY

Items and Abstracts for ENGINEERING AND HIGHWAY DEPARTMENTS

Nearly 10,000 Miles of Federal Aid Highway Improved Last Year

A TOTAL of 9,753 miles of Federal Aid highway was improved in the calendar year ending December 31, 1928, by the 48 State Highway Departments and that of Hawaii, in cooperation with the United States Bureau of Public Roads. Of this total, 7,625 miles had not previously been improved with Federal Aid while 2,128 miles which had already been so improved was brought to higher stages of construction. These figures bring the total mileage improved with Federal Aid, as of December 31, 1928, to 76,075 miles. In the Federal Aid system there is a total of 188,017 miles.

At the end of December 9,216 miles of Federal Aid roads were under construction and 1,597 miles were approved for construction. Of the mileage not previously improved by Federal Aid, South Dakota, with 578 miles, heads the list of states. North Dakota, with 490 miles, ranks second; Nebraska, with 483 miles, is third; Kansas, with 423 miles, is fourth; New York, with 416 miles, is fifth; Texas, with 361 miles, is sixth; Montana, with 298 miles, is seventh; and Alabama, with 276 miles, ranks eighth. With the exception of New York and Texas, the largest mileages of the above states are for the most part of the lower types of road construction. In mileage already improved with Federal Aid and brought to higher types of construction, North Dakota, with 385 miles, heads the list of states; Nebraska, with 278 miles, ranks second; Texas, with 261 miles, is third; South Dakota, with 252 miles, is fourth; Minnesota, with 118 miles, is fifth; Iowa, with 106 miles, is sixth; South Carolina, with 92 miles, is seventh; Wyoming, with 78 miles, is eighth; Alabama, with 58 miles, is ninth; and Georgia, with 57 miles, ranks tenth.

The 9,753 miles improved in 1928 is 18 per cent more than the mileage improved during the preceding year.

Good Roads and a Fire

A GOOD road recently helped to save Faribault from destruction when flames attacked the business center of that city. The local fire department needed help in the emergency. From Owatonna, 15 miles to the south, and from Northfield, 15 miles to the north, help came and came quickly. Motorized fire apparatus speeded from both directions along a broad paved highway plowed clear of snow. In the old days, with a 2-foot snow blanket punctuated with powdery drifts, help would have had to come on runners, and help coming on runners probably would have arrived too late.

Should Faribault have another serious fire during the soggy season in the spring, Faribault can still rely upon equally prompt arrival of assistance from her neighbors. Not so fortunate are dozens of other towns scattered along heavily traveled highways that have a way of bogging down for weeks at a time when the frost goes out of the earth beneath them.

A motorized age requires roads that are travelable at high speed every day in the year. Gravel and earth roads subject to heavy traffic are not travelable at high speeds every day in the year. Gravel and earth roads subject to heavy travel should be paved.

—From the *Minneapolis Journal.*

A Novel Street-Widening Project in San Francisco

THE contract for the removal of all bridge structures within the boundaries of Bernal Cut Boulevard, San Francisco, is now in progress. The structures now being removed include the arch structure carrying the Southern Pacific tracks over Bosworth Street, the vehicular bridges over the railroad at Charles Street, and the foot-bridge and pipe-bridge at Fairmont Street. A new bridge of the concrete girder type will be constructed at Bosworth Street to carry the double tracks of the Southern Pacific Co., the double tracks of the proposed municipal railway extension, and a 42-foot vehicular roadway and an 8-foot sidewalk. The estimated cost of this bridge is $220,000. A concrete vehicular bridge, estimated to cost $40,000, will be built across the cut to connect Highland Avenue to Arlington Street. A third bridge, estimated to cost $11,000, will be built for pedestrian traffic from Richland Avenue to Miguel Street. The water-main supplying College Hill Reservoir will cross the cut underground in the form of an inverted siphon.

The contract also includes grading and the construction of walls, stairways, sewers, pavements and coping, and necessary electrical work, at a total cost of approximately $550,000.

Snow Removal in Hartford, Conn.

THE city of Hartford, Conn., which has 200 miles of streets, approximately 170 of which are sufficiently improved to permit snow plowing, has an effective organization, under the leadership of Leon F. Peck, Superintendent of Streets. Plowing is done with 17 snow-plows owned by the city, but attached to rented 5-ton motor trucks. Snow is entirely removed from about 23 miles of streets, using three Nelson snow loaders together with hand labor.

Snow is disposed of by dumping off the dock into the Connecticut River and through the floors of six bridges over the smaller Park River, which extends across the city from west to east near the business center. The various snow squads are supervised by assigning foremen and inspectors to this work from the twenty-odd branches of regular work.

PROGRESS OF REMOVAL OF THE ARCH STRUCTURE CARRYING SOUTHERN PACIFIC TRACKS OVER BOSWORTH STREET, SAN FRANCISCO

Operations on December 22, 1928, are shown at the left, and progress on January 8, 1929, is shown at the right

PART OF THE SHIPMENT OF W&T UNIVERSAL TYPE FLASHERS FURNISHED DAYTON, OHIO

DAYTON DECIDES

on W & T Universal Type Flashers

AFTER a searching investigation into the merits of various types of flashers for street and highway service, the experts at Dayton, Ohio, have selected the Wallace & Tiernan Universal Type Dry Battery Operated Flasher for fifteen safety zones in their city.

BECAUSE—

A Standard W&T Slow Flasher

W&T Flashers are reliable—when a lamp burns out another is automatically brought to the focal point. This unique feature is exclusive with W&T Flashers.

W&T Flashers have a low operating cost—six months' service on one set of batteries.

W&T Flashers are easy to maintain—self-contained unit using 1½ Volt Standard Dry Batteries available anywhere.

W&T Flashers are rugged in design, yet attractive in appearance —C. I. base and shaft; wire re-inforced lenses; special weather resistant finishes; pleasing proportions.

W&T Flashers command attention—45 brilliant flashes each minute; lenses are free from fogging due to condensation.

W&T Thru Street Stop Flasher with Reflector Buttons

WALLACE & TIERNAN

COMPANY, INCORPORATED

Manufacturers of Chlorine Control Apparatus

NEWARK · NEW JERSEY

NEW YORK CHICAGO KNOXVILLE SAN FRANCISCO MINNEAPOLIS PITTSBURGH DALLAS KANSAS CITY
LOS ANGELES SEATTLE ST. LOUIS BUFFALO HARRISBURG INDIANAPOLIS DETROIT BOSTON
WALLACE & TIERNAN, LTD., TORONTO, CANADA WALLACE & TIERNAN, LTD., LONDON, ENGLAND

Fl-9

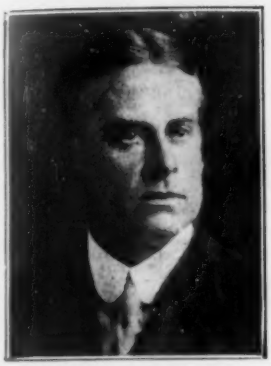
ALSO SEE OUR ADVERTISEMENT ON PAGE 69

FRED L. CLARK
City Engr., Nashua, N. H.
(Appointed 1925)

EDWARD M. HUNT
City Engr., Portland, Me.
(Appointed 1916)

FREDERICK C. WILLIAMS
City Engr., Pawtucket, R. I.
(Appointed 1928)

GEORGE C. STANLEY
City Engr., Burlington, Vt.
(Appointed 1920)

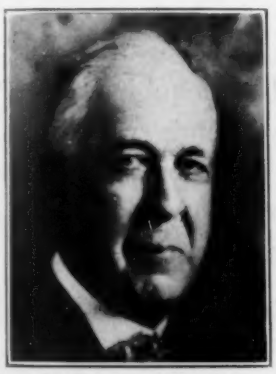


WALTER S. WHEELER
City Engr., Dover, N. H.
(Appointed 1925)

WHO'S WHO AMONG CITY ENGINEERS

Installment No. 8—Portraits of City Engineers in Five States

JOHN A. JONES
City Engr., Lewiston, Me.
(Appointed 1884)



CHARLES A. FRENCH
City Engr., Laconia, N. H.
(Appointed 1906)

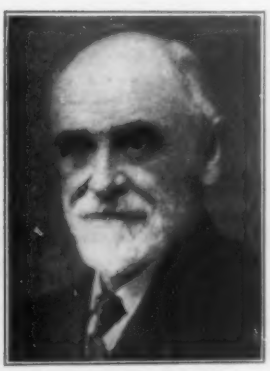
EVERETT B. COFFIN
City Engr., Waterville, Me.
(Appointed 1927)

FRANCIS L. BRANNEN
City Engr., Berlin, N. H.
(Appointed 1925)

JOSEPH H. WHITE
City Engr., Woonsocket, R. I.
(Appointed 1929)

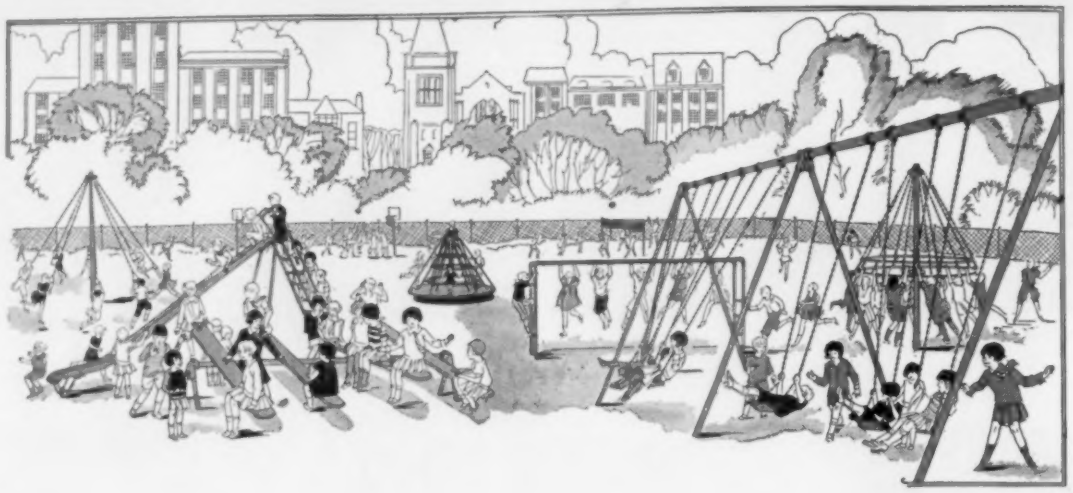
BERNIS B. WEBER
City Engr., Oil City, Pa.
(Appointed 1913)

E. BRADLEY ABBOTT
City Engr., Gardiner, Me.
(Appointed 1928)



ALLAN B. DOWNS
Town Engr., Lebanon, N. H.
(Appointed 1890)

HENRY W. FOSTER
City Engr., Westbrook, Me.
(Appointed 1920)



More Playgrounds —Fewer Accidents

KEEP the children off the streets –give them good playgrounds with plenty of fun-making, muscle-building, health-developing equipment—and yours will be a town where accidents involving children are few and far between.

For 21 years, Everwear Playground Apparatus has been recognized as the standard of quality. Built to withstand the abuse of after-hours roughnecks. Embodies every element of safety human ingenuity can devise. Playable as though the kids themselves had planned it.

Schools, institutions, cities, — the country over which have equipped their parks and playgrounds with Everwear Equipment have found it superior. Also more economical, because of its greater durability.

Send for Catalog which gives complete information. Lists 161 different models and sizes of apparatus with which to build your playgrounds.

THE EVERWEAR MANUFACTURING CO.
Dept. 1
SPRINGFIELD, OHIO

EverWear
PLAYGROUND APPARATUS

When you write for that catalog, kindly mention THE AMERICAN CITY.

The Great Business Value of Leisure-Time Activities

TO those—if they still exist—who regard as uneconomic the trend in recent years towards a shorter work-day and work-week, the following paragraphs are commended. They are from the report, released May 15, of the Committee on Recent Economic Changes of the President's Conference on Unemployment:

Optional Consumption

"The rapidly increasing number of families in the United States having a considerable margin of earnings available for 'optional consumption'—optional in the sense that this portion of the income may be saved or spent, and if spent the manner of its spending may be determined by the tastes of the consumer or the nature of the appeals made to him by the industries competing for his patronage—presents one of the marked characteristics of the recent economic situation. It is the personal or individual expression of the gap between rising wages and the relatively stable cost of living, referred to at the beginning of this section.

"Closely related to the increased rate of production-consumption of products is the consumption of leisure.

"It was during the period covered by the survey [1922-1929] that the conception of leisure as consumable began to be realized upon in business in a practical way and on a broad scale. It began to be recognized, not only that leisure is 'consumable,' but that people cannot 'consume' leisure without consuming goods and services, and that leisure which results from an increasing man-hour productivity helps to create new needs and new and broader markets.

"The increasing interest in the fine arts and in science; the increased sales of books and magazines; the increase in foreign travel; the growing interest and participation in sports of all kinds; the domestic pilgrimages of some 40,000,000 motor tourists who use more than 2,000 tourist camps; the greatly increased enrollment in our high schools and colleges; the motion-picture theaters and the radio—all these reflect the uses of increasing leisure. . . .

"Few of the current economic developments have made such widespread changes in our national life or promise so much for the future as the utilization of our increasing leisure."

The Park and the Active Playing Area

PERHAPS one of the most specific definitions of a park is that by the late J. F. Foster, who was Superintendent of the South Chicago park system and one-time President of the American Institute of Park Executives, who once said: "To be great and beautiful, a park, no matter what other things it may contain, must have trees, great trees, numberless trees; it must have shrubbery without limitation; it must have the beautiful reflection to be found in small pools and great lakes, and the delightful movement of water playing in fountains and basins."

Items and Abstracts *for* PARK AND PLAYGROUND DEPARTMENTS

He further said that "in parks it is really the unexpected, unannounced perfection which gives the greatest delight, and the greatest attractions are the quiet, the beauty and the shade trees." It will be seen, therefore, that the attractive appearance of the landscape and its adaptation to human use and enjoyment are the dominant characteristics of a park.

The rapid spread of the active recreation movement has caused some apprehension regarding the purpose and use of parks; but if the proper balance was always maintained between active and passive recreation, there would be no cause of disagreement. If those areas that are mainly used for active recreation were designated as playfields, athletic grounds, or landscaped playgrounds, instead of being called parks, and if all active playing areas set aside in parks were definitely designated to be visually separated from areas of passive recreation, there would be little cause for differences of opinion.

L. GLENN HALL,
Landscape Engineer, Los Angeles Park Department.

Matching Wits with Wild Animals —Assorted Styles

YOU can persuade a bear a great ways, and appeal to the curiosity or the greed of a monkey; and there are ways of managing all sorts of jungle beasts but none of them include compulsion, according to Clyde Hill, Director of the Denver City Park Zoo, who has profound insight into the ways of his friends and daily associates.

A bear though often unreliable in character is amenable to control by strategy, he has found. Getting the blacks and the browns from one place to another can be reduced to such an art that often they will roam out cage free and amble over to where they are most wanted. Even a notion-y mother bear will follow her squawking kidnapped cubs to new quarters. Grizzlies, polars, and their tribe are not quite so simply managed, but are easy marks for well-planned "confidence games" when changes of quarters are under way. And all such traits of adaptability in bears can best be appreciated, Mr. Hill says, by those who are familiar with the way of a fighting roaring bruin in full protest.

The lion, the lynx, and other felines are impervious to persuasion but dislike shower baths and will drop their dignity and flee before the first few brief spouts from a garden hose; monkeys equally dislike the cold water treatment, and its use is avoided in their case when possible. Curiosity and greed generally will weaken their resistance, but if all else does fail a terrifying cold shower instantaneously stops all "monkey business." "It is amusing," the above authority says in his discussion of the subject in a recent issue of the local journal, *Municipal Facts*, "to watch Jocko observe all preparations with disgust and apparent indifference, then, just as the keeper stoops to turn on the 'current,' plunge for life and safety.

Wild animals in Mr. Hill's experience will not "drive" like their domestic relatives and the slightest suspicion of attempted compulsion arouses their wild nature to an alarming extent. Consequently, in most cases, a policy of watchful waiting is pursued and often considerable time is required to complete the work. Ungulates—buffalo, elk, deer, etc.—he says, sometimes become so frantic that they seriously injure themselves or even drop dead from terror. In one instance a buffalo cow in his charge leaped nearly nine feet in the air to shatter a double layer of two-inch planking which surmounted her confine.

Official Reports on Recreational Areas of Brownsville, Canton, and Newark

NEW data on park areas of three cities —Brownsville, Texas; Canton, Ill.; and Newark, N. J.—have just been issued by the United States Bureau of Labor Statistics, supplementary to its survey of "Park Recreation Areas in the United States," published as Bureau Bulletin No. 462, 1928.

Brownsville, according to a communication of Park Commissioner B. E. Hinckley to the Bureau, has acquired during recent months additional park space totaling around 500 acres. Canton comes within the Canton Park District, which, according to F. A. Perkins, Secretary-Attorney of the District, includes one park of 110 acres, a recreation and athletic field of 18 acres, and two smaller parks, making a total of 135 acres. Carl Bannwart, Superintendent of Newark's Department of Parks and Public Property, gives the following figures regarding the park areas of his community:

City parks (administered by the Department of Parks and Public Property), 28.7 acres.
Playgrounds (administered by the Newark Board of Education), 45.0 acres.
County parks within the city limits (administered by the Essex County Park Commission), 892.62 acres.
County parks outside the city limits (administered by the Essex County Park Commission), 3,000 acres.
City-owned watershed (administered by Division of Water Department of Public Affairs, available for limited recreational uses.)

These cities have populations of 12,512, 11,027, and 452,513 respectively, according to census reports of 1925.

For Other Articles

dealing with parks and recreation, see pages 91, 94, 123, 128, 142, and 145.

Tomorrow's Voters
Will Thank Today's Thinkers

To replace the old paper ballot with voting machines requires, in most states, only a slight amendment to the election laws. Copies of existing laws in states now using voting machines, which will serve as models, can be furnished.

PUBLIC officials who look beyond the present are observing the universal trend toward voting machines.

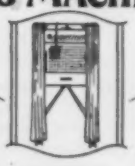
Enthusiastic public acceptance—from voters and election officers alike—marks the installation of voting machines in cities and towns that have not previously used them.

In one state after another progressive officials and an enlightened public are turning to this modern method of voting.

Over 2,000 cities and towns have discarded the inefficient paper ballot for the voting machine, thereby speeding up elections, preventing spoiled ballots, obtaining immediate and mechanically accurate returns and saving time and money for the tax payer.

Write today for a booklet explaining the economies of voting machines and their other many advantages. There is no obligation. Ask for Booklet A9

AUTOMATIC VOTING MACHINE CORPORATION



JAMESTOWN NEW YORK

Inaugurating a New Department on Matters of Finance

THIS month marks the beginning of a new monthly department in THE AMERICAN CITY, entitled "The Taxpayer's Dollar," and devoted to budgeting, assessment, taxation, accounting and other phases of municipal finance. The editor is A. E. Buck, a nationally recognized authority in this field, particularly in connection with budgets. He has had long contact with these matters as a staff member of the New York Bureau of Municipal Research and the National Institute of Public Administration, of 261 Broadway, New York, and has participated in financial surveys and the installation of financial reorganization and budget systems in various states and cities. Mr. Buck joined with Dr. Frederick A. Cleveland in the preparation of "The Budget and Responsible Government" (1920), is the author of "Budget Making" (1921), and, in collaboration with his fellow staff members, wrote "Municipal Finance" (1926), a work of outstanding value to city administrators and others concerned with the financial aspects of city government.

This new feature will be found at pages 159 to 161 of this issue.

Interest on Bank Deposits of Colorado Cities

THE tabulation given below, appearing in the March issue of *Colorado Municipalities*, organ of the Colorado Municipal League, shows the surprising fact that of 29 cities having over 2,000 population, that submitted data, 14, or nearly half, received no interest on their average daily bank balances. Twelve received 2 per cent, and one each received 2¼, 2½ and 3 per cent respectively:

	Per Cent Received on Average Daily Balance	Interest Received
Alamosa	0	.....
Boulder	2	$1,736
Brighton	2	274
Colorado Springs	2	2,274
Cripple Creek	0	.....
Delta	3	1,686
Denver	2	30,645
Durango	2	693
Englewood	0	.....
Fort Collins	2	2,745
Fort Morgan	0	.....
Glenwood Springs	2	360
Golden	0	.....
Grand Junction	2	2,613
Greeley	0	.....
La Junta	0	.....
Lamar	0	.....
Las Animas	0	.....
Leadville	0	.....
Longmont	2.25	2,901
Loveland	2	206
Monte Vista	0	.....
Montrose	2.25	253
Pueblo	2	2,340
Rocky Ford	0	.....
Salida	0	.....
Sterling	2	500
Trinidad	0	.....
Walsenburg	2	(No data)

About a Chequered Table—Then and Now

IT is only during the last few years that the word "budget" has come into common use, with its processes that serve to plague housewives and control the expenditures of nations, we are reminded by the Detroit Bureau of Governmental Research in one of a series of leaflets entitled "Just a Minute," devoted to Detroit's 1929-1930 financial program. These same years that have witnessed the familiarization of the word "budget," it adds, have seen important changes in the preparation of budget estimates—in the "segregation," the "functionalization," of budgets.

"We know that the modern budget must be formulated by the chief executive and represent his program of work for the fiscal period; that it should record all, not part, of the estimated receipts and proposed expenditures of the government; that proposed expenditures should not exceed proposed revenues; that salaries and other items should be listed in detail and in accordance with a uniform classification; that careful comparison should be made between requests and previous expenditures; that each activity or function should be 'segregated' so that the citizens may know precisely what the city proposes to do and how much it will cost; and that provision should be made for the spending of the money appropriated exactly as the legislative body intended."

Like all institutions, it is suggested, the budget and budget procedure are matters of evolution and must grow as new circumstances require.

It was the Norman Henry, son of the Conqueror, who first "sat his household barons about a chequered table—hence Exchequer,—and twice a year called in the sheriffs of the counties to account for the rent from royal domains, the land tax, court fines, and feudal dues.

"A few generations later the Chancellor of the Exchequer was carrying an estimate of these revenues and the plans for spending them to the Parliament in a leather bag or 'bougette.'" The use of scientific budget procedure first introduced into this country in the financial estimates of the Department of Health of New York City in 1907, "spread rapidly, and was adopted by all the larger and many smaller American cities, by forty-seven of the forty-eight states, and in 1921 by the National Government."

Items and Abstracts *for* FINANCE AND LEGAL DEPARTMENTS

The Municipal Bond Market

By SANDERS SHANKS, JR., EDITOR, *The Bond Buyer*

DESPITE the absence of any improvement in the outlook for the bond market in general, municipal bond prices scored a considerable advance during April, and the higher values have been maintained down to the date this is written. The explanation of the market's favorable action is to be found solely in the conservative attitude of states, cities and other borrowers toward the issuance of new bonds during the current period of high interest rates. The result has been a relative scarcity of the best grade bonds.

The recent New York City financing illustrates how the market has been kept quite bare of new bonds. Early in May the city decided to offer for sale the $52,000,000 3½-year subway bonds, issuance of which was postponed last December because of the unfavorable outlook. A rate of 5¼ per cent was named. Several syndicates of investment houses were organized to bid for this issue. With considerable apprehension as to how so large an issue would be received by their clients, these bidders made their offers to the city. The best syndicate bid named a price of 100.899. Much to the surprise of every one, however, it was found that Kuhn, Loeb & Co. had tendered the city an offer of 101.411 for the issue. The bonds were awarded to that house and promptly withdrawn from the market, having been placed privately.

An increase in the output of new bond issues is usual at this season of the year, and it is evident that during the next two months the volume of state and city financing will show some expansion. The course of prices during the immediate future will probably depend almost entirely upon the extent to which municipal borrowers extend their borrowing programs.

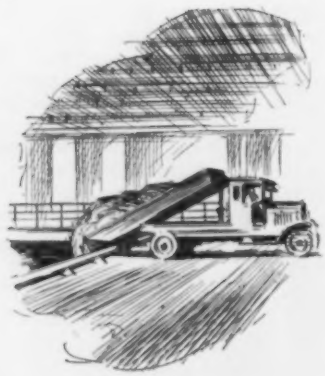
The following table of representative issues indicates the trend of the municipal bond market at the present time:

Amount	Issue	Rate (%)	Maturity	Basis
$385,000	Lowell, Mass.	4¼	1-30-Yr.-Ser.	4.22
450,000	St. Paul, Minn.	4¼	18½-Yr.-Avg.	4.23
150,000	Southampton, N. Y.	5	1-10-Yr.-Ser.	4.25
500,000	Salt Lake City, Utah, Sch. Dist.	4	20-Yr.	4.28
250,000	St. Joseph, Mo., Sch. Dist.	4	13½-Yr.-Avg.	4.39
1,165,000	Paterson, N. J.	4½	26 5/6-Yr.-Avg.	4.43
247,000	West Allis, Wis.	4½	11-20-Yr.-Ser.	4.47
23,000	Northampton, Pa.	4½	7 2/3-Yr.-Avg.	4.49
8,933,000	Chicago, Ill.	4	Various	4.54
1,050,000	Durham, N. C.	4⅝	27-Yr.-Avg.	4.54
1,800,000	Winston-Salem, N. C.	4⅝	16¾-Yr.-Avg.	5.58
1,000,000	Austin, Texas	4⅝	19-Yr.-Avg.	4.63
225,000	Toledo, Ohio	4¾	13 5/6-Yr.-Avg.	4.66
600,000	Malone, N. Y., Sch. Dist.	4⅝	15 1/6-Yr.-Avg.	4.67
125,000	Des Moines, Iowa	5	5¾-Yr.-Avg.	4.68
32,000,000	New York, N. Y.	5¼	3½-Yr.	4.8065
190,000	Marshall Co., Tenn.	4¾	1-30-Yr.-Ser.	4.85
30,000	Maricopa Co., Ariz., Sch. Dist. No. 69	5	20-Yr.	4.99

Could you despoil *these who have so little?*

Let us speak candidly of facts: You and I, who live in comfort and in ease, on pleasant streets, in pleasant homes, are far removed in thought and actuality from others of our fellow citizens. We have much. They have little more than basic necessities; shelter, food and air.

They *can't* be despoiled of their enjoyment of any of these—and yet they sometimes are. For when refuse disposal plants are built on city streets, they are *their* streets; and when those plants are unsanitary and pour foul vapors on the air, *they* are the ones to suffer most.



And it is all so unnecessary! Mixed garbage and refuse can be destroyed offenselessly, as the Sterling Destructor destroys it. It can be burned at high temperatures and completely oxidized, as it is in the Mutual-cell furnaces. It can be reduced to sterile gas and clean ash, as it is reduced in Bartlett-Snow installations.

If you would care to know more about our system, write for the Sterling Destructor book.

THE C. O. BARTLETT & SNOW CO.
6220 Harvard Ave. Cleveland, Ohio

Bartlett - Snow

Refuse Disposal Plants

When you write for that catalog, kindly mention THE AMERICAN CITY.

State Chambers Form Smoke Abatement Board

A NEW YORK and New Jersey Smoke Abatement Board to supplement work already under way to reduce the smoke nuisance in the metropolitan district, was organized recently by the State Chambers of Commerce of those two states.

An executive committee of six members, three to be selected by each Chamber, will conduct the program of the new and permanent Board. Samuel G. Frantz, an engineer affiliated with the Stevens Institute of Technology, is Secretary of the Board and will have charge of the administrative details. Jacob H. Haffner, Chairman of the Committee on Public Service of the New York State Chamber, is the Chairman of the Smoke Abatement Board, to which the executive committee will report at regular intervals.

In addition to the executive committee, the conference authorized the appointment of committees on plan and survey, observation and cooperation, ordinances, health, and education. Dr. S. W. Wynne, Commissioner of Health for New York City, participated in the creation of this Board.

American Legion Will Present Safety Film

A SPECIAL motion picture entitled "Stop! Listen! Live!" has been prepared for display in conjunction with the safety program of The American Legion. Made by a reliable moving-picture company under the direction of railroad safety experts, the film depicts the approved practices in handling an automobile at a railroad crossing, and the tragic results of pursuing unsafe tactics.

The film will be shown in local theaters throughout the country under the auspices of Legion posts, and there is no mention of any particular railroad included, although the carriers are purchasing the reels to supply them to the various posts. A brief description of the film follows:

Starting with the title and an announcement that it is being shown in cooperation with The American Legion, the film first shows a railroad crossing with an automobile in the foreground. The car is stopped before the sawbuck crossing sign, and a train speeds by.

The second scene is taken from a moving automobile looking out over the hood. From the auto, a crossing warning sign is seen, and the film switches to a close-up of this sign. A subtitle then reads: "When a motorist sees this sign, he has 300 feet in which to slow down and STOP if train is approaching." The car is then shown approaching closer to the tracks, and another subtitle reads: "Auto under full control could make a COMPLETE STOP before crossing rails."

An animated drawing is featured next, depicting a road and a railroad crossing as if viewed from above. An automobile moves along the road, and as it approaches the warning sign, the driver is shown to perceive it. The car approaches the crossing at a reduced speed, but trees obstruct the driver's view of the track to the right. Stopping his car, the driver looks up and down the track, but a subtitle indicates that he cannot see to the right as it says: "Look in both directions—but from a clear vision point." The auto then moves up to a better vision site, and the driver, seeing the track is clear in both directions, crosses over.

Items and Abstracts *for* CIVIC AND COMMERCIAL ORGANIZATIONS

"Double track! Double danger! Take no chances!" read the next title. In this case, the driver stops his car as warned by the sign and waits, as he notices a train coming in one direction. As the last coach passes, he starts his engine, but thinks to look in the other direction before driving across. Another train is coming from the opposite direction and he waits until it has passed.

"Another man gambled and lost," states the following title. The scene depicts an automobile attempting to beat a train to the crossing. The engineer applies the brakes, but it is too late and the car is hurled down the tracks, a twisted mass of wreckage and mangled bodies. The film is concluded with safety message from The American Legion and an animated art title with a crossing sign in the background.

Ohio Chamber Puts Over City Recreation Program

UP to February 1, 1929, the city of Steubenville, Ohio, spent only $1,800 annually on municipal recreation, maintaining six small recreation fields that were supervised only during two months of the year.

After a survey by the Chamber of Commerce which was endorsed at the annual meeting of that body and also by various service clubs, these organizations, as reported in *Nacos News*, gained an appropriation from the city of $9,000 for recreation supervision. In addition, $40,000 was allotted for two municipal swimming pools, two club houses, a municipal golf course, 10 municipal tennis courts and equipment for seven recreation fields.

An all-year recreation director is to be provided, under the new plan, as well as three full months of supervision, and spring and fall supervision after school hours.

Texarkana Chamber Favors City-Manager Government

A RECOMMENDATION that the city charter be changed so as to provide for the city-manager form of government was contained in the twenty-third annual report of the Texarkana Chamber of Commerce, recently issued.

The report also urged that the Chamber of Commerce cooperate with the city governments of Texarkana, Ark., and Texarkana, Texas, in the formulation of a comprehensive city plan and adequate zoning regulations. Mention was made as well of the desirability of establishing additional parks and playgrounds. All these recommendations are in accordance with a five-year civic development program which the Texarkana Chamber of Commerce has adopted.

Boston Chamber Conducts Successful Art Week

SEVERAL thousand persons and a number of civic and commercial bodies participated in the special Art Week observance conducted recently by the Committee on Industrial and Civic Art of the Boston Chamber of Commerce.

Window displays of industrial as well as cultural art featured the week's program. An exhibition of clothes, selected as examples of good design from the artistic standpoint by a jury of the Massachusetts State Federation of Women's Clubs, appeared in the windows of one of the leading department stores. There were also special exhibits of paintings and sculpture, of the work of the art students in the junior high schools of the city, and of the accomplishments of the Business Men's Art Club of Boston.

An industrial art meeting of the Associated Industries of Massachusetts was held at the Boston Art Museum, and a number of lectures were given there and at other such gatherings on the place of art in industry. Governor Allen indorsed the observance, and the Boston newspapers commented favorably on the broad scale on which the program was conducted.

Housing Tour of Europe

A HOUSING tour of Europe designed to include visits to the principal centers of housing development in England and on the Continent has been organized in connection with the International Housing and Town Planning Congress in Rome on September 14.

The arrangements are being made by Major Chester P. Mills, of the Morriss Service, Inc., 551 Fifth Avenue, New York City, to whom all inquiries regarding details of the trip should be addressed.

The tour is a comprehensive one, starting at London, taking in a large number of the principal cities on the Continent, and arriving at Rome on the opening day of the convention. The party will sail from New York August 16 on S. S. Caronia, and return from Havre for New York on September 21.

Belleville, Ill., Chamber Studies Local Industries

A study of the city's present industries, with the aim of assisting the management of each in the solution of its problems, is a feature of the industrial program of the Belleville, Ill., Chamber of Commerce.

The Board of Directors of the Chamber is obtaining first-hand information by inspection tours of the various factories. This initial step is followed by conferences with the plant managers, who are asked to explain any difficulties which the Chamber might be able to alleviate. The Directors note the suggestions advanced by each manager, and when their study is complete, will submit a comprehensive report to the members.

Articles of Interest

to civic and commercial organizations include those relating to the federated plan for Pittsburgh (p. 120); municipal purchasing (p. 140); and the "Forward Steps" department (p. 145).

GAMEWELL

1929 MODEL

PEERLESS TRANSMITTER

ANOTHER member of our 1929 line of models used for sending out box and telephone alarms to engine houses on automatic, semi-automatic, and manual systems. Among its features are: positive non-interfering and succession movement that looks in at every round, complying with N.F.P.A. recommendations—dial type of number set-up—locked dials to prevent interference following number set-up—special code signals can be sent preceding box numbers—greater speed in number set-up—all number dials restored by one operation—panel sloped at convenient angle—dead front panel protects operator—highly insulated throughout—handles 1 to 4 round inclusive—capacity of 24 complete rounds at one winding.

Descriptive Bulletins Sent Upon Request

1929 Model Codewell

Competitive tests have proved conclusively that the *Codewell* signal has greater carrying power than any other coding siren in the field. It also sounds *four* rounds of a signal while the next fastest siren is sounding only *one and one-half rounds.*

THE GAMEWELL COMPANY

Newton Upper Falls, Mass.

"A BOX A BLOCK"

A. A. A. Issues Statement on School Safety Patrols

THE authority of school boards to designate pupils as "student patrols" to direct traffic near schools and to and from school buildings, has been studied by the American Automobile Association.

From its investigation, the Association has reached the following important conclusions:

"1. That school boards have no power to direct traffic, and, therefore, no school board, or agent of any school board, has any power to designate school boy patrols which are given the right to, or charged with, the responsibility of directing traffic.

"2. That school superintendents and school principals may establish school boy patrols for the purpose of 'directing school children in traffic, and providing an orderly dismissal from school.'

"3. That school boys shall be asked to volunteer for school boy patrol duty, and not assigned or detailed to it.

"4. That the consent of parents shall be obtained before a boy is placed on patrol duty.

"5. That the past policy of the American Automobile Association regarding the operation of school boy safety patrols is correct. The A. A. A. has always advocated that 'patrolmen when on duty at street intersections will take their posts on the curb—not in the street.'

"6. That in event of injury to a boy patrolman, or to a school child crossing the street under the guidance of the school boy patrol, there is no liability attached to the school board, school superintendent, the school principal, or the city, providing that the patrols are organized as advocated by the A. A. A., and not permitted to stand in the street or direct traffic."

A Criminal's Arraignment of Society—and the Answer

"I HAVE stood in the dark cell of solitary confinement at Joliet with my hands manacled above my head until every part of my body became numb except my brain. It became more active, filled with thoughts of how I might avenge myself against a society which would practice upon one who had violated its laws, the suffering that I was undergoing. I pledged myself that upon my liberation, my whole endeavor would be to make some member of that same society suffer as I had."

This statement is quoted by John F. Delaney, Supervisor of Public Relations for Cook County, Ill., as having been made to him by a man who had spent much of his time in the penitentiary, and at the time was awaiting execution.

This is a type story in which the criminal states his case. It is complete,—complete but for the sequel which Mr. Delaney has put into one sentence:

"Cook County's answer is the new Criminal Court Building and County Jail."

This group of buildings, now completed at a cost of about $7,500,000, is "a humanitarian contribution, by the citizens of Cook County to the program of restoring the good name of the community to the world"; and it is believed by those who have worked for its realization, to be a model from which the modern plan of rehabilitating the criminal derelict to a respectable place in society will be molded.

Some day, perhaps, there will be general recognition throughout America of the fact that restoring to society the man or woman who has infringed the laws cannot be most fruitfully accomplished in dank and dismal, unsanitary and vermin-ridden cells or jail buildings; but that crime germs, like disease germs, can more effectively be killed under rays of sunlight, sanitation, humane treatment and hope for the future.

Items and Abstracts for DEPARTMENTS of PUBLIC SAFETY

Require More Fire-Alarm Boxes in Rhode Island

ASYLUMS, almshouses, hospitals, orphanages and schools in Rhode Island are now required by law to be equipped with one or more fire-alarm boxes.

This bill, just signed by the Governor was sponsored by the Rhode Island Fire Chiefs' Club and is the third of its type passed during the last three years. New York approved such a measure last year, and South Carolina adopted a similar one in 1926. An act embodying the same principles has been presented before the Florida State Legislature and has the support of fire chiefs' organizations in that state.

The Rhode Island law requires the corporation or city operating the particular institution affected to bear the expense of installing the necessary fire-alarm boxes. The fire department in each district must connect the boxes with the central alarm system, inspect them regularly, and maintain them in good condition throughout their period of service.

ONE OF THE NEW POSTERS IN THE PUBLIC SAFETY SERIES, OBTAINABLE FROM THE NATIONAL SAFETY COUNCIL, CHICAGO, ILL.

County Attorney Conducts Successful Police School

THE School of Instruction for Police Officers conducted by District Attorney Robert T. Bushnell, of Middlesex County, Mass., has proved a success. The next session will be held in November and will be open to all police who care to attend.

About 3,000 police officers attended the first session, which lasted for two hours each day for two weeks, the meetings being held in the banquet room of the Elks' Home in Cambridge.

Mr. Bushnell lectured on "The Law of Arrest," "With What Offense is the Prisoner to be Charged?," "The Law of Search Warrants," "Double Jeopardy," "Highlights of the Law of Evidence," and "Rules for Witnesses."

State Officer Edward J. Sherlock, homicide expert, discussed the subject of criminal investigations.

How Cities in New York Take Care of Fire-Apparatus Repairs

DATA compiled by the New York State Bureau of Municipal Information shows that 38 cities operate municipal repair shops for the repair of Motor Fire Apparatus, 24 have repairs made by private garages and in 3 cities the repairs are made by the manufactures of the fire apparatus.

In 8 cities the repair shops do work for other departments in addition to its Fire Department. In Buffalo $25,000, in Yonkers $12,000, in Mount Vernon $9,000, and in Utica $3,500 was appropriated for maintaining repair shops. In other municipalities the amount ranged from $1,000 to $3,000.

(For comprehensive suggestions as to maintenance of motored fire apparatus, see the article at page 93).

Specially Important to Police and Fire Departments

are the articles, "New Headquarters and Gymnasium Occupied by St. Louis Police Department" (p. 105); "Fire Protection for Municipal Airports" (p. 114); "How Fire Police Function in New York Communities" (p. 139); and "Fighting Traffic Violations by Concentrated Surprise Attacks" (p. 144), in addition to the one noted in the item just preceding.

Day or Night

you can't get away from it!

RUBBER

STANDARD Sure Stop MARKER

YOU don't have to look for them---you can't avoid seeing them. Made of flexible rubber, stands upright on the pavement, and when run over by wheel, bends flat to pavement; when vehicle passes, they flip right back again! Can't injure vehicle or marker. Always visible---signal their polite command day or night. Motorists see and obey them in more than

1100 CITIES

STANDARD TRAFFIC MARKER CO.

WICHITA, KANSAS, U. S. A.

JOHN J. TOWEY
Fire Chief, Newark, N. J.
(Appointed 1925)

EREMIAH McGILL
Fire Chief, Trenton, N. J.
(Appointed 1921)

PHILIP T. BELL
Police Chief, Kearny, N. J.
(Appointed 1924)

NIELS J. TONNESEN
Police Chief, Perth Amboy, N. J.
(Appointed 1921)

CHARLES A. McGINLEY
Fire Chief, East Orange, N. J.
(Appointed 1927)

WHO'S WHO IN PUBLIC SAFETY

A Series of Portraits of Fire and Police Chiefs, Which Have Appeared Monthly Since the January, 1928, Issue

R. H. BOWKER
Fire Chief, Passaic, N. Y.
(Appointed 1909)

AUGUST GERSTUNG
Fire Chief, Elizabeth, N. J.
(Appointed 1901)

HORACE L. BYRAM
Police Chief, Asbury Park, N.J.
(Appointed 1918)

WESLEY J. DUNN
Fire Chief, Plainfield, N. J.
(Appointed 1923)

JOHN P. MURPHY
Police Chief, Summit, N. J.
(Appointed 1922)

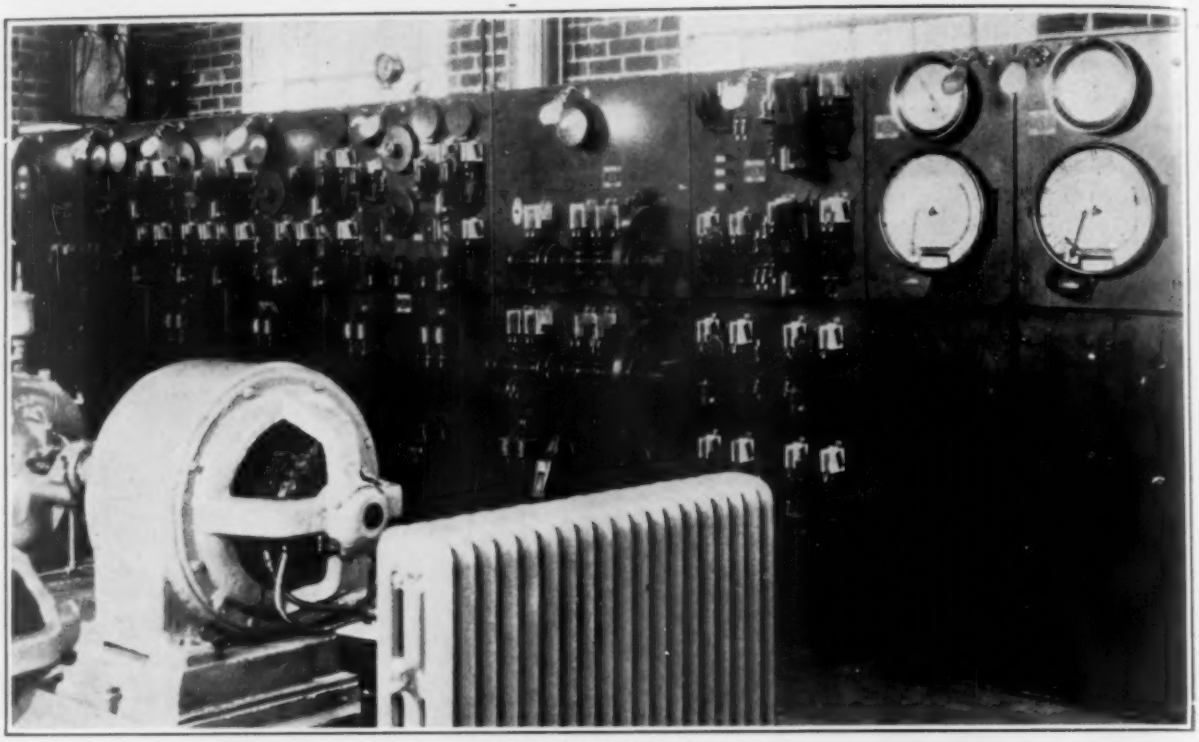
AUGUST KLASSEN
Police Chief, Weehawken, N. J.
(Appointed 1921)

JAMES J. McMILLAN
Fire Chief, Orange, N. J.
(Appointed 1923)

NICHOLAS L. PERRAPATO
Police Chief, Garfield, N. J.
(Appointed 1928)

JETHRO GIBBS
Fire Chief, Montclair, N. J.
(Appointed 1923)

Sundh automatic control for pumping water



CITY OF MONMOUTH, ILL.

A SAVING OF $31 PER DAY

Prior to the installation of this equipment in the pumping station it was costing the City of Monmouth $45 per day for fuel and labor, pumping 490,000 gal. per day from three wells with air compressors. Today it is pumping a total of 550,000 gal. at a power cost of $14 per day and one attendant part time, who receives a wage of $115 per month, making a total cost of $17.85 per day or a pumping cost delivered into the mains at 3¼ cents per 1,000 gallons.

How the Sundh control is operated

The automatic features are controlled by pressure regulators and float switches placed in the reservoir and on the distribution system. The float switches are arranged to give a 4-ft. regulation in the reservoir and these switches control the two deep-well pumps. The pressure regulators on the service pumps are so arranged that should the demand be greater than the capacity of the No. 1 pump, then the No. 2 pump will cut in automatically and stay on the line until the elevated tank is full. These pumps, are arranged on the board so that they can be alternated and either of them be used as a standby. The piping of the service pumps is laid out in such a manner that they can be operated in series to assist the fire pump in case of an extraordinary demand. The elevated tank is protected from being exhausted of its water supply by a pressure regulator on the switchboard so that an alarm will ring should the water supply become dangerously low.

Whatever your control problem—take it up with Sundh. No obligation.

SUNDH ELECTRIC COMPANY, INC.

Reliable Control

Parkhurst St. at Ave. C Newark, N. J. U. S. A.

SUNDH TRADE MARK

Representatives and Branch Offices:

BIRMINGHAM Jos. W. Eshelman, 1220 American Traders Bank Bldg.
BOSTON Arthur H. Abbott, Inc., 88 Broad St.
BUFFALO W. T. Quinby, 1010 Morgan Bldg.
CHICAGO Thos. E. Beasley, 333 No. Michigan Ave.
CINCINNATI R. M. Heim, 2413 Union Central Bldg.
CLEVELAND G. H. Gildersleeve, 439 Terminal Tower Bldg.
DENVER Joy & Cox, Inc., 314 Tramway Bldg.
DETROIT Ralph D. Ernest, 200 Coe Terminal Building.
LOS ANGELES Otto Demmert, 106 W. 4rd St.
MINNEAPOLIS H. R. Harris, 708 6th Ave. So.
NEWARK L. L. Wilcox, Parkhurst St. at Ave. C.
NEW ORLEANS Lyman C. Reed, 1230 Hibernia Bank Building.
NEW YORK CITY P. W. Moeller, 51 E. 42d. St.
PHILADELPHIA H. F. Darby, Jr., 1700 Walnut St.
PITTSBURGH Rutherford & Uptegraff, Suite 1414, Clark Building.
ST. LOUIS D. O. Stew art, 619 Bank of Commerce Bldg
SAN FRANCISCO Utilities Equipment Corp., 1644A Rush Bldg.
SEATTLE Thomas S. Wood, 505-507 Polson Bldg.
VANCOUVER B.C. Phillips-Henderson Co., 500 Beatty St.

USE THIS FREE SERVICE

THE AMERICAN CITY should always be mentioned when writing for this material which is furnished free.

Keep your files up to date by checking over these items each month and writing for those you need.

TRUNK MAIN SURVEYS

The Pitometer Co., 52 Church St., New York, N. Y., has just issued a Bulletin No. 16, on the Cole Pitometer System, describing in detail its method of making distribution studies and trunk main surveys, and giving typical maps of each.

HOT PROCESS WATER SOFTENERS

A 12-page catalog, Bulletin No. 5049, has just been issued by the Graver Corp. (Joseph C. Winslow, Adv. Mgr.), East Chicago, Ind., describing the Graver hot process water softener. A feature of this catalog is a flow sheet in colors which is printed on an extension of the front cover so that the reader may have it before him when reading the descriptive matter.

NEW WATER-METER YOKE

The Ford Meter Box Co. (John L. Ford, Sales Mgr.), Wabash, Ind., will be pleased to send complete information and prices regarding its new yoke, which is intended primarily for water-meter installations where pipe and meter are set in a straight line through the meter box.

TREE MOVING

Landscape architects, park superintendents and tree surgeons interested in moving shade trees to more appropriate locations, will be interested in a new folder issued by the Caterpillar Tractor Co. (W. H. Gardner, Adv. Mgr.), San Leandro, Calif.

TAPPING MACHINES

Details and prices on Mueller water-main tapping machines and drilling machines, which are dependable, accurate, easy to operate and long-lived, may be secured on request from the Mueller Co. (C. N. Wagenseller, Adv. Mgr.), Decatur, Ill.

FILTERING WATER

The Roberts Filter Mfg. Co., 602 Columbia Ave., Darby, Pa., will be pleased to send information regarding Roberts filters for municipal water-supply systems, as well as recirculation plants for outdoor and indoor swimming pools.

HIGHWAY PROTECTION

Servicised expansion joint, which handles as readily as a board, is easily installed and free from breakage and has great resiliency and resistance to flow, is made by the Servicised Products Corp. (A. C. Fisher, Pres.), 53 W. Jackson Blvd., Chicago, Ill., from which complete information may be secured on request.

ECONOMICAL ROAD ROLLERS

Galion Iron Works & Mfg. Co. (U. R. Creasey, Adv. Mgr.), Galion, Ohio, will be pleased to send complete information and prices on its 4-cylinder Master road rollers, which are easy to operate and economical in the consumption of gasoline and oil.

RECORDING FIRE-ALARMS

A descriptive bulletin on the 1929 model Peerless speed register for service in fire-alarm central offices or fire stations to permanently and automatically record fire alarms or other emergency signals, may be secured from the Gamewell Co., Newton Upper Falls, Mass.

METERS FOR WATER-WORKS

Sustained accuracy of registration, and low maintenance costs, are two of the features of Trident and Lambert water meters, which are made in sizes and types for every problem of water-revenue production by the Neptune Meter Co. (H. W. Ballantine, Treas.), 50 E. 42nd St., New York, from which complete information may be secured.

CATALOGS ON SEWAGE DISPOSAL

Catalogs on sewage-disposal apparatus, sewer-flushing siphons, sewer pipe joint compound, sewage ejectors, sludge pumps, flush-tank water regulators or Imhoff tanks, may be secured without obligation from the Pacific Flush Tank Co. (S. Fisher Miller, Pres.), 9 Park Pl., New York.

WATER CHEMICAL FEEDERS

The W. J. Savage Co., Knoxville, Tenn., has issued an interesting 16-page booklet No. 28, describing the Gauntt continuous chemical feeders for water purification plants.

PLAYGROUND MERRY-GO-ROUNDS

The Karymor, an overhead, rigid suspension type merry-go-round which meets the demand for safe, durable, good-looking playground equipment that will accommodate a large number of children at one time, is described in the Karymor Catalog which may be secured from R. F. Lamar & Co. (Ralph F. Lamar, Pres.), 443 Thatcher Bldg., Pueblo, Colo.

PERMANENT WELL SCREENS

A new bulletin describing Johnson red brass well screens, which have 30 to 50 per cent more inlet area, resulting in more water and lower pumping costs, may be secured on request from Edward E. Johnson, Inc., 2304 Long Ave., St. Paul, Minn.

CONCRETE PRESSURE PIPE

Permanence, high carrying capacity, tightness, expansion joints, long life and no tuberculation are some of the features claimed for Lock Joint reinforced concrete pressure pipe, complete information on which may be secured from the Lock Joint Pipe Co., Ampere, N. J.

VALVES, FITTINGS AND HYDRANTS

Valves for a wide range of sizes, pressures and types of operation, watergates and fire-hydrants, and pipe fittings are made by the Kennedy Valve Mfg. Co. (C. H. Kennedy, Gen. Sales Mgr.), Elmira, N. Y., which will be glad to send complete information and prices on request.

WATER METERS

The Gamon Meter Co. (Robert A. Anderson, Gen. Mgr.), Newark, N. J., will be pleased to receive inquiries regarding Gamon Watch Dog meters, which have proved their value and economy in many municipal installations.

WATER PURIFICATION

City officials interested in the purification of the city's water-supply should secure complete data and prices on International water purification plants from the International Filter Co. (O. A. DeCelle, Mgr., Sales Dept.), 333 W. 25th Pl., Chicago, Ill.

VALVES OF EVERY KIND

The Golden-Anderson Valve Specialty Co., 1385 Fulton Bldg., Pittsburgh, Pa., will gladly send complete information and prices on its complete line of valves, including controlling float valves, controlling altitude valves, water relief valves, water pressure regulating valves and check valves.

DEEP-WELL PUMPS

Downie deep-well pumps, which are built in many styles and sizes, single and double stroke with direct steam, power belt or direct motor drive, are made by the Keystone Driller Co. (J. V. Downie, Adv. Mgr.), Beaver Falls, Pa., from which complete information and prices may be secured.

SLUICE-GATES

Complete information regarding Coldwell-Wilcox self-contained, non-rising stem type sluice-gates, operated by wrench, handwheel or floor stand, as well as plug drain valves, shear valves, flap drain valves, etc., may be secured from the Coldwell-Wilcox Co. (John D. Eldridge, Sec.), Water St., Newburgh, N. Y.

FIRE-HYDRANTS

City officials contemplating the installation of fire-hydrants should write to R. D. Wood & Co. (Chas. H. Becker, Mgr., Hydrant and Valve Sales, 400 Chestnut St., Philadelphia, Pa., and ask that company to explain the exclusive features of the Mathews hydrant, which permit the replacement of broken hydrants in a few minutes without excavation or breaking up the pavement.

POOL AND PLAYGROUND APPARATUS

Catalog 10, describing Hill-Standard Fun-Ful playground apparatus, and Catalog 6, illustrating beach and swimming pool equipment, will be sent on request by the Hill Standard Co., Division A, Anderson, Ind.

DIESELS FOR POWER

The Nordberg Mfg. Co. (Delbert Kay, Adv. Mgr.), Milwaukee, Wis., will be pleased to send a copy of its Bulletin NY-3 to city officials interested in diesel power for their cities.

WATER AND GAS PIPE

Cast iron pipe for water and gas in sizes from 2 to 60 inches, as well as special castings, high-pressure fire service pipe, Warren short body specials, etc., are made by Warren Foundry & Pipe Co. (J. H. Morrison, Sales Mgr.), Bowling Green Bldg., New York.

FIRE-HYDRANTS AND APPARATUS

The complete catalog of the Waterous Co. (Fred Waterous, Vice-Pres.), St. Paul, Minn., describes the Waterous line of rotary pumps, fire-hydrants and fire apparatus.

PORTABLE FIRE-PUMPS

The American Steam Pump Co. (C. R. Davis, Sales Mgr.), Battle Creek, Mich., will be pleased to receive requests for its Bulletin 60, describing Barton pumps, which can be used with practically all types of fire apparatus and handle water from either hydrant pressure or suction.

LOWER STREET-LIGHTING COSTS

Full information on Hazard cable, in which has been substituted a non-metallic armor for the usual steel armor, making it possible to use 20-ampere street-lighting circuits with a lighter cable, easier to handle and low in cost, may be secured from the Hazard Insulated Wire Works (C. P. Brodhun, Asst. Gen. Sales Mgr.), Wilkes-Barre, Pa.

SMOOTHER, TRIMMER LAWNS

The Ideal Power Lawn Mower Co. (W. L. Austin, Sales Mgr.), 400 Kalamazoo St., Lansing, Mich., will gladly show in detail the five reasons why Ideal Bulldog mowers cost less to operate, last longer and give smoother, trimmer grass.

SLUDGE-BED ENCLOSURES

Complete information on King sludge-bed enclosures, which mean more dryings per year, plant operation regardless of weather, better control of odors, less space requirement and better appearance of the plant, may be secured from the King Construction Co. (L. G. Eshelman, Adv. Mgr.), North Tonawanda, N. Y.

DEPENDABLE SERVICES

Wakefield galvanized amalgamated lead-lined iron pipe and fittings, which are low in cost, easy to install and permanent for dependable service installations, are made by the Lead Lined Iron Pipe Co., Wakefield, Mass.

WIRE FABRIC FOR ROADS

A copy of the new Road Book issued by the American Steel & Wire Co. (Wilmer H. Cordes Mgr., Adv. Dept.), 208 S. La Salle St., Chicago, Ill., will be mailed upon request to city officials interested in triangle mesh or electric weld wire fabric for re-inforcing concrete roads and making them permanent investments.

VALVES, FILTERS AND HYDRANTS

The Ross Valve Mfg. Co., Inc. (Wm. F. End, Sec.), Archibald St., Troy, N. Y., will be pleased to send information regarding its line of automatic pressure-control valves, feed-water filters, portable fire-hydrants, hydraulic engines and hydraulic booster pumps, to interested city officials on request.

The Spending Public
kept on spending . . . .

with the Armco Jacking Method *the road was never closed!*

IT looked to us like a very difficult job. We had to provide a new culvert under the main road into a nearby town. The usual open trench and detour would seriously cut business for the local merchants in favor of a nearby city — the situation was "ticklish" to say the least. ¶Thanks to the Armco Jacking Method the culvert is now in place without an hour's loss of the use of the road . . . "the spending public kept on spending." ¶It will pay anyone who needs an additional opening under an existing road to investigate the Armco Jacking Method. There is no longer any need for expensive open trench and costly detours. The assistance of Armco engineers is available to you on every Armco culvert job. They have valuable data gathered from many years of field experience, not obtainable from any other source.

Armco culverts and drains are manufactured from the Armco Ingot Iron of the American Rolling Mill Company and always ... its brand

ARMCO CULVERT MANUFACTURERS ASSOCIATION

Middletown, Ohio

ARMCO CULVERTS

© 1929, A. C. M. A.

FIRE RECORD BOOKS

A free copy of the Daily Fire Report Record Book, as well as complete information regarding Eureka Red Cross fire-hose, which has been adopted as standard equipment by many large cities, may be secured from the Eureka Fire Hose Mfg. Co. (J. H. Green, Mgr.), 50 Church St., New York.

CAST IRON CULVERTS

Full information on U. S. culverts and facts about deLavaud cast iron pipe, as well as the service of engineers in working out satisfactory solutions to unusual road drainage problems, may be secured from the U. S. Cast Iron Pipe & Foundry Co. (John D. Capron, Publicity Mgr.), Burlington, N. J.

ENCLOSING ATHLETIC FIELDS

School officials interested in enclosing school athletic fields should secure complete information and prices on Anchor Fence from the Anchor Post Fence Co. (J. G. Mayer, Adv. Mgr.), Eastern Ave. and Kane St., Baltimore, Md.

ECONOMICAL POWER

If you want facts and figures on the savings an Anderson Diesel engine will make in your power-plant, write for full particulars to the Anderson Engine & Foundry Co. (G. H. Blaker, Sales Mgr.), Anderson, Ind.

ORNAMENTALS FOR CITY PLANTING

Andorra Nurseries, Inc. (J. H. Humphreys, Sec.), Chestnut Hill, Philadelphia, Pa., specialize in ornamentals, distinctive in quality and variety for street, park and all civic planting, on which they will be glad to send information on request.

PLAYGROUND APPARATUS

The catalog of the Everwear Mfg. Co., Dept. 1, Springfield, Ohio, lists 161 different models and sizes of apparatus with which cities, schools and institutions may equip their parks and playgrounds.

WATER-WORKS CHEMICALS

City officials interested in water-works chemicals should send for the catalog listing the products of the General Chemical Co., 40 Rector St., New York.

FIRE-TRUCK TIRES

Information on Goodyear All-Weather tread tires, which are especially designed for fire-truck service, as well as other Goodyear tires which fit the demands of street maintenance trucking and street sprinkling, as well as other city work, may be secured from the Goodyear Tire & Rubber Co. (C. T. Hutchins, Adv. Mgr.), Akron, Ohio.

THE TRAFFIC-CONTROL SYSTEMS

Eagle Signal Sales Corp., Moline, Ill., manufacturers of traffic-control fire-alarm and police-signal equipment will gladly send complete information on these, as well as the Harrington-Seaberg Co-Ordiplex traffic-control system.

MAP AND PLAN REPRODUCTION

Bulletins of special interest to city engineers and tax departments regarding Lithoprints, which are ink reproductions on any material of tracings, maps or plans, will be sent on request by the Lithoprint Co. of New York, Inc. (W. H. Cushman, Pres.), 41-43 Warren St., New York.

SLUDGE-BED GLASS-OVERS

The Lord & Burnham Co., Graybar Bldg., New York, has an interesting informative binder on sludge-bed glass-overs which it will be pleased to send on request to city officials interested.

STREET AND TRAFFIC SIGNS

Lyle Signs, Inc. (F. L. Pierce, Vice-Pres. and Sec.), 171 27th Ave., S. E., Minneapolis, Minn., has issued a 32-page catalog on its street and traffic signs and signals, and a booklet, "Sign Problem on City Streets," copies of which may be secured without obligation by city officials.

CHEMICALS FOR WATER-WORKS

Information and prices on the Mathieson line of water-works chemicals will be sent free to interested water-works officials by the Mathieson Alkali Works, Inc. (J. R. Schmertz, Adv. Mgr.), 250 Park Ave., New York.

RAIL FILLER

Inquiries on Sealtight rail filler, protection planks, crossing planks, bridge flooring, and industrial flooring, should be addressed to the Universal Asphalt Plank Co., 5 N. La Salle St., Chicago, Ill., agents for W. R. Meadows, Inc., Elgin, Ill., which also makes Sealtight expansion joints.

COMPLETE PUMPING EQUIPMENT

New catalogs containing complete, comprehensive data on American centrifugal pumps, plunger pumps, and deep-well power heads are now available from the American Well Works (H. W. Spiller, Sec.), Aurora, Ill.

THREE LAWN BOOKLETS

Three booklets, "The Seeding and Care of Lawns," "Bent Lawns," and "Lawn Care," which solve grass-growing problems for golf courses, airports, athletic fields, public parks and private lawns, may be had for the asking from O. M. Scott & Sons Co., Marysville, Ohio.

ASPHALT PRODUCTS

Specifications and all other particulars on Standard asphalt products, including binders, joint fillers, cold patch asphalt, refined asphalt for sheet asphalt paving, paving flux, bridge asphalt and preserving oils, will be furnished on request by the Standard Oil Co. of New York, 26 Broadway, New York.

TREE PROTECTION

An interesting booklet describing Tree Tanglefoot, which is applied in bands around tree trunks to protect trees from climbing and creeping insects, as well as for waterproofing cavities, crotches and wounds, will be mailed on request by the Tanglefoot Co., Grand Rapids, Mich.

LOWER CULVERT COSTS

Information regarding the use of Toncan copper molybdenum iron corrugated culverts and their wear-resisting and corrosion-resisting qualities, may be secured from the Toncan Culvert Manufacturers Assn. (H. J. Bair, Sales Mgr.), Massillon, Ohio.

SIGNS AND MARKERS

The catalog of street signs, boulevard markers and danger signals issued by the Union Iron Products Co. (C. E. Kitchen, Pres.), East Chicago, Ind., is for free distribution to city officials interested in street marking and warning signs of all kinds.

MUNICIPAL CASTINGS

Prices and complete details of the D. & D. safety and noiseless manhole cover, as well as manhole, catch-basin and sewerage castings of all kinds, may be secured from Wm. E. Dee Co. (A. J. Wittak, Sec.), 80 N. La Salle St., Chicago, Ill.

ASH CANS BUILT FOR ABUSE

Prices and particulars on Canco ash cans, which are made of extra-heavy stock and put together by skilled workmen so that they are able to stand hard use, may be secured on request from the American Can Co. (W. H. Blank, Mgr.), Galvanized Ware Dept., Toledo, Ohio.

BELT DRESSING

Circular 107-0 of the Joseph Dixon Crucible Co. (B. L. Rowley, Adv. Mgr.), Jersey City, N. J., gives full information on Dixon's belt dressing for leather, rubber and fabric belts and also on Dixon's traction belt dressing, a special paste dressing for use on belts which are exposed to steam, spattering water, chemicals or heavy dust conditions.

HOW TO MAINTAIN ROADS

This is the title of a free book offered by the Dow Chemical Co. (Donald Williams, Asst. Sales Mgr.), 361 Jefferson St., Midland, Mich., describing the use of Dowflake calcium chloride, which minimizes the need for frequent grading and road material replacement.

ELECTRIC PUMP CONTROL

Problems involving close regulation of water-levels and pressures are solved by EC&M altitude regulators, cushion tanks and automatic motor starters, all of which are described in Bulletin 1100-T of the Electric Controller & Mfg. Co. (R. G. Widdows, Sales Mgr.), 2700 E. 79th St., Cleveland, Ohio.

SUBSTANTIAL PUMPING MACHINERY

City officials interested in pumping machinery which has an established reputation for substantial construction, long life and maintained high economy, should secure the literature of Allis-Chalmers Mfg. Co., Milwaukee, Wis.

COPPER SERVICE TUBING

The American Brass Co., Waterbury, Conn., will be pleased to send complete information and prices on Anaconda Deoxidized copper tubing furnished in straight lengths up to 20 feet and in coils up to 60 feet, which can be readily bent to avoid underground obstructions.

WATER-PIPE JOINTS

The Hydraulic Development Co., 50 Church St., New York, has issued an interesting folder describing Hydro-Tite, a simple, economical pipe joint material which saves both labor and material costs.

SIDE-WEDGING GATE-VALVES

Full details regarding Michigan side-wedging gate-valves for water, steam, gas or oil, which are long-lived and require less valve maintenance, may be secured from the Michigan Valve & Foundry Co. (P. J. Goldie, Vice-Pres.), P. O. Box 822, Detroit, Mich.

A NEW METER CATAIOG

The 1929 edition of "Niagara and American Meters," the new catalog of the Buffalo Meter Co. (Chas. K. Bassett, Sec.), 2902 Main St., Buffalo, N. Y., will be mailed free to water-works superintendents.

SANITARY SEWER PIPE

Complete data and prices on vitrified salt-glazed clay sanitary sewer pipe, may be secured on request from the Clay Products Assn. (George C. D. Lenth, Sec.), Conway Bldg., Chicago, Ill.

METER-BOX COVERS

The Reading Meter Repair Co. (Emil H. Nuebling, Pres.), Reading, Pa., has described in its Catalog A its line of specialties, including gate-valve housings, curb boxes, meter testers, melting furnaces, jointing materials, and four-in-one pumps, as well as the Reading meter-box cover, which is exceptionally roomy and allows the meter to be removed without digging up the cover.

NATATORIUM FILTERS

The catalog of the Norwood Engineering Co. (H. W. Hosford, Mgr.), Florence, Mass., tells how free public baths can be kept wholesome, clean, invigorating and safe at nominal cost through the use of the Norwood three-unit filtration system.

EVERYTHING FOR A PIPE SYSTEM

Catalogs and prices on Clow-National products, including all kinds and sizes of cast iron pipe and fittings, hydrants, valves, service pipe and special castings for all kinds of pipe systems, may be secured from James B. Clow & Sons, 201 N. Talman Ave., Chicago, Ill., or National Cast Iron Pipe Co., Birmingham, Ala.

HYDRANTS AND VALVES

Detailed information regarding Columbian fire-hydrants, gate-valves and meter boxes, which perform readily and efficiently under the most strenuous use, may be secured from the Columbian Iron Works, Chattanooga, Tenn.

STEEL BARRICADE SUPPORTS

The Cleveland Steel Specialty Corp., 6602 Park Ave., Cleveland, Ohio, will gladly send details on Cleveland steel barricade supports, which are ruggedly constructed and self-locking, and can be easily assembled and dismantled by one man.

MUNICIPAL FENCES

Cyclone fence, which is made in a variety of styles for parks, playgrounds, municipal property, residences, estates, factories and other property of all kinds, as well as the new H-Column Cyclone post, is made by the Cyclone Fence Co. (J. H. Kinney, Gen. Sales Mgr.), Waukegan, Ill., from which information and prices may be secured on request.

CENTRIFUGAL AND DEEP-WELL PUMPS

Platt centrifugal pumps, Smith-Vaile steam pumps and Smith-Vaile triplex pumps for deep-well installations are all described in a loose-leaf folder issued by the Platt Iron Works (A. H. Kruer, Sales Mgr.), Dayton, Ohio.

ATHLETIC AND PLAYGROUND EQUIPMENT

J. E. Porter Corp. (G. S. Mobus, Sales Mgr.), Ottawa, Ill., has issued a very complete 40-page illustrated booklet on Louden playground equipment of all kinds, as well as combination outfits, basketball equipment, water equipment for beach and pool, and a diagram for a complete athletic field.

SEWER-PIPE JOINTS

No. 1 Korite, an asphaltic product for making leak-proof sewer-pipe joints, developed by the Standard Oil Co. of Indiana (C. C. Lakin, Mgr., Asphalt Dept.), 910 S. Michigan Ave., Chicago, Ill., is described in a folder which may be secured on request.

Servicised Products Include:
Expansion Joints
Asphalt Planking
Waterproofing Protection Course
Rail Filler and Track Insulation and Crossing
Sewer Pipe Joints
Roofing Products
All forms of Fibrated Bituminous Construction Materials

SERVICISED
LOOK FOR IT ON ALL PURCHASES
© 1920

Public Interest Demands *Expansion Joints!*

BOND issues, taxes, license fees are being poured by the millions into concrete highways everywhere. A very avalanche of road construction! Gray ribbons of smooth, hard, rigid, thin, sheet stone exposed to nature's whims of upheaval.

Fine now, at the dedication—what when ice and snow, rain and frost, zero and one hundred, flood and draught and blazing heat—the extremes of high and low in these forty-eight States, have all had their will? Get out on the road and look!

Nature's law is that concrete cannot be commanded to lie still under ups and downs of temperatures, but man's ingenuity does provide Expansion Joints which can be placed at intervals so that Nature's *irresistable pulsating* action will *expend* itself *harmlessly*.

The motorist wants safe roads. He pays for them, largely. He is entitled to protection for his roads, as much as for his automobile.

Servicised Expansion Joints give just this protection. They make pavements stay young. They are made in types to suit specifications, kind of roads and variations in climate. Servicised Joints should be used in the interest of safer, better, more economical and more permanent highway construction.

Your specifications priced promptly. Write for New Catalog 11.

SERVICISED
REG. U.S. PAT. OFF. © 1915

PRODUCTS CORPORATION

Factory: 6051 W. 65th St. Chicago, Ill.
Gen'l Office: 53 W. Jackson Blvd. Chicago, Ill.

JUNE, 1929
Vol. XL, No. 6

The American City

443 Fourth Avenue
New York

50 Cents, $4 a Year

THE AMERICAN CITY advocates for municipalities and counties:

1. *City and regional planning and zoning for spacious development*
2. *Streets and roads that are well built, well lighted, well cleaned*
3. *An abundant supply of pure, soft, palatable water*
4. *Sanitary disposal of sewage and garbage*
5. *Fire and police departments properly trained and equipped*
6. *Thorough and uniform traffic control; fewer grade crossings*
7. *Plenty of parks, parkways, playgrounds, and swimming pools*
8. *Administrative efficiency and citizenship cooperation in bringing these things to pass*

Lansing Owns and Installs All Water Meters

By L. E. HACKETT
SUPERINTENDENT, WATER DEPARTMENT, LANSING, MICH.

THERE are, at the present time, in the city of Lansing, Mich., 21,500 water services and 18,000 water meters. The services range in size from ½-inch to 10-inch, and the meters from ⅝-inch to 10 inch. The difference in number represents services which are installed for future use on streets which are paved, services not in use at present and some dual installations.

Lead, brass, copper and cast iron pipe are used for services at the present time, with ¾-inch pipe as the minimum size. All of the services which are in use are metered, the fire services being measured by a meter bypassed around a detector check-valve.

All meters installed at the present time are placed inside the building or, if it is necessary to install the meter on the outside, meter-boxes of our own specifications are used. All meters are owned, installed and maintained by the Board of Water and Electric Light Commissioners.

Classification of Meters

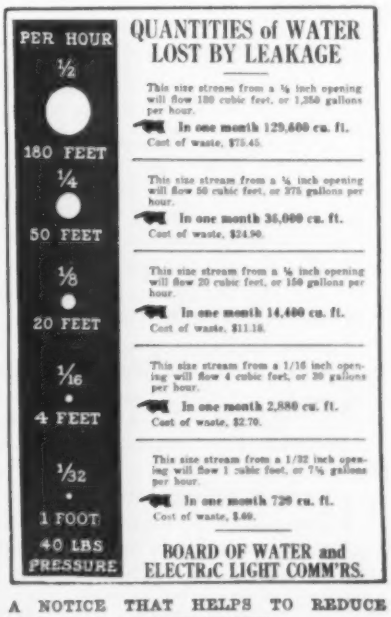
Water meters are classified under one of three divisions—industrial, commercial, or residential—and the amount of water consumed in each of these divisions, as well as the amount of revenue derived from each, is kept in the accounting department, thus giving very valuable information on the sources of revenue.

Industrial installations are those for factories and large plants, commercial installations cover stores and garages, while the residential installations include dwelling-houses and apartments.

Meter Reading

There are three meter readers who take care of all meter reading, except in the case of special readings, which are handled through a service man whose sole duty is to turn water off and on; when water is turned off, this necessitates reading the meter, so that a bill may be rendered.

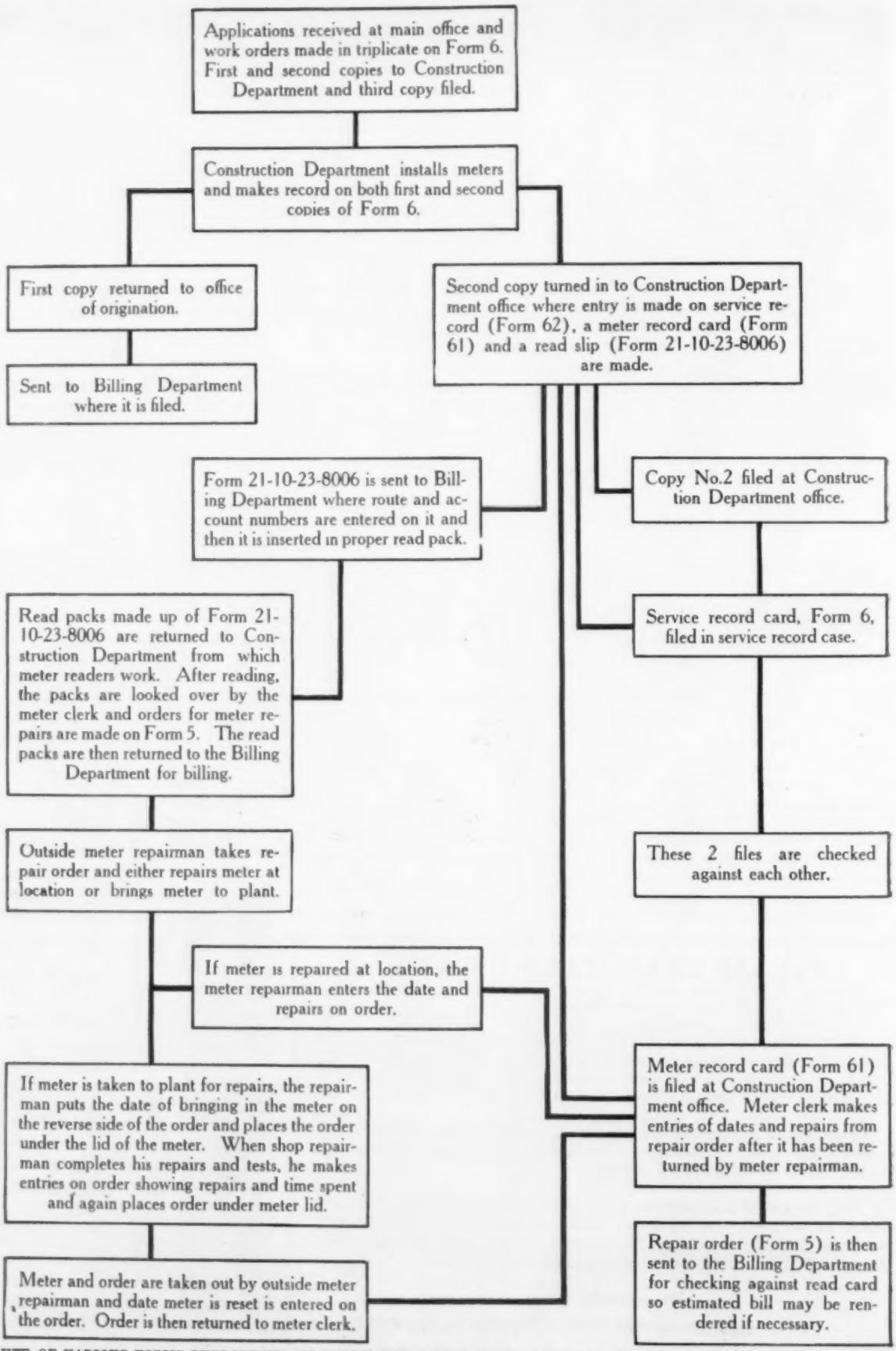
Meters up to 1-inch in size are read quarterly, and larger meters are read


PLEASE READ—TAKE CAUTION
It has taken centuries of time, thought and invention to bring water distribution to its present highly specialized state of development. Picture if you can what would happen in any community if the Water Works should stop for a few days without warning.
You would see industrial paralysis, indescribable physical and mental suffering, conflagrations and other disastrous results. It would be the greatest of all calamities.
Yet, so accustomed are we to go to the faucet and draw as much water as we need, and generally waste as much more, that we give no heed to the tremendous importance of the most desirable and necessary gifts which mankind has bestowed upon us.
Respectfully yours,
BOARD OF WATER & ELECT. LIGHT COMM.

A PLEA FOR THE USE, NOT WASTE, OF WATER

PER HOUR
½
180 FEET
¼
50 FEET
⅛
20 FEET
1/16
4 FEET
1/32
1 FOOT
40 LBS PRESSURE
QUANTITIES of WATER LOST BY LEAKAGE
This size stream from a ¼ inch opening will flow 180 cubic feet, or 1,350 gallons per hour.
In one month 129,600 cu. ft.
Cost of waste, $75.45.
This size stream from a ⅛ inch opening will flow 50 cubic feet, or 375 gallons per hour.
In one month 36,000 cu. ft.
Cost of waste, $24.90.
This size stream from a 1/16 inch opening will flow 20 cubic feet, or 150 gallons per hour.
In one month 14,400 cu. ft.
Cost of waste, $11.16.
This size stream from a 1/16 inch opening will flow 4 cubic feet, or 30 gallons per hour.
In one month 2,880 cu. ft.
Cost of waste, $2.70.
This size stream from a 1/32 inch opening will flow 1 cubic foot, or 7½ gallons per hour.
In one month 720 cu. ft.
Cost of waste, $.40.
BOARD OF WATER and ELECTRIC LIGHT COMM'RS.

A NOTICE THAT HELPS TO REDUCE WATER WASTE


Applications received at main office and work orders made in triplicate on Form 6. First and second copies to Construction Department and third copy filed.
Construction Department installs meters and makes record on both first and second copies of Form 6.
First copy returned to office of origination.
Sent to Billing Department where it is filed.
Second copy turned in to Construction Department office where entry is made on service record (Form 62), a meter record card (Form 61) and a read slip (Form 21-10-23-8006) are made.
Form 21-10-23-8006 is sent to Billing Department where route and account numbers are entered on it and then it is inserted in proper read pack.
Copy No.2 filed at Construction Department office.
Service record card, Form 6, filed in service record case.
Read packs made up of Form 21-10-23-8006 are returned to Construction Department from which meter readers work. After reading, the packs are looked over by the meter clerk and orders for meter repairs are made on Form 5. The read packs are then returned to the Billing Department for billing.
Outside meter repairman takes repair order and either repairs meter at location or brings meter to plant.
These 2 files are checked against each other.
If meter is repaired at location, the meter repairman enters the date and repairs on order.
If meter is taken to plant for repairs, the repairman puts the date of bringing in the meter on the reverse side of the order and places the order under the lid of the meter. When shop repairman completes his repairs and tests, he makes entries on order showing repairs and time spent and again places order under meter lid.
Meter record card (Form 61) is filed at Construction Department office. Meter clerk makes entries of dates and repairs from repair order after it has been returned by meter repairman.
Meter and order are taken out by outside meter repairman and date meter is reset is entered on the order. Order is then returned to meter clerk.
Repair order (Form 5) is then sent to the Billing Department for checking against read card so estimated bill may be rendered if necessary.

ROUTE OF VARIOUS FORMS REPRODUCED ON FOLLOWING PAGES FROM APPLICATION FOR SERVICE THROUGH REPAIRS TO METERS

FORM NO. 6

WATER DEPARTMENT OFFICE ORDER No. 59396

DATE 192 ACCT. NO.

NAME ORDER

ADDRESS

METER NO. MAKE

LOCATION

TURN ON SHUT OFF 3

INSTALL REMOVE

READ COLLECT REPORT DATE 192

TO

TO BE

FROM

SECURITY

REMARKS REPORT BY

LABOR

MEN. AT

INSTALL MATERIAL REMOVED

FRONT AND REVERSE OF FORM 6 USED BY ORDER CLERK WHEN A NEW SERVICE IS REQUESTED

SERVICE RECORD

No._____

Date_____ 192____

Owner _____

Location _____

Connection _____

REPORT

C. B. to Main _____

C. B. _____

FORM 62

FRONT OF FORM 62 USED BY CONSTRUCTION DEPARTMENT TO RECORD NEW SERVICE INSTALLED

METER

DATE INSTALLED	SIZE	MAKE	NUMBER	DATE REMOVED

REVERSE OF FORM 62

monthly. In the case of large consumers, there is a special set of meter read cards for the meters involved, which are read semi-monthly. The cards for these readings are kept at the construction department office and no bills are rendered from them, but the information is for the benefit of the department in detecting errors or stopping meters between the regular readings. This also tends to prevent loss of revenue from a meter making a complete revolution.

Each meter reader carries a pack of Form No. 11 slips and in case of unusually high or unusually low readings, fills out one of the slips and indicates the exact position of the hands on the meter. If the meter is inside and he cannot gain admittance, a note is made on the reverse of Form 11 and the reader later goes back and tries again. If he is still unable to gain admittance, he leaves a postcard, Form 16-A, which is herewith reproduced and explains itself. The lock slip is then turned in, with a notation indicating that Form 16-A has been left.

In case of exceptionally high or low readings a second follow-up order for verification and investigation is sent to the construction department from the billing department, and a man is sent out to re-read and attempt to find the cause of the wide variance in consumption.

Testing Meters

Meters above 1-inch in size are repaired and tested at location, a test tee being provided on each installation. Meters up to and including 1-inch in size are brought to the water-works office, where they are repaired and tested. While a meter is being taken to the plant for repairs, a nipple is inserted in its place, and the same meter with the same reading is reset as soon as possible after being repaired.

MAKE MODEL SIZE No.

DATE PURCHASED ____ 19____ DATE CONDEMNED ____ 19____

	DATE	REGISTER	LOCATION	SET BY
SET				
OUT				
SET				
OUT				
SET				
OUT				
SET				
OUT				
SET				
OUT				
SET				
OUT				

Form 61.

FRONT OF FORM 61, WHICH IS THE PERMANENT METER RECORD KEPT ON FILE IN THE CONSTRUCTION DEPARTMENT OFFICE

PER CENT.— FAST OR SLOW	DATE	FROZEN	STUCK	CLEANED	BOTTOM CASE	TOP CASE	DISC	DISC CHAMBER	REGISTER	GEARS			REMARKS
1-16th., 1-2 in., Full													

REVERSE OF FORM 61. WHEN A METER IS FINALLY CONDEMNED THIS CARD CONTAINS THE DATA TO COMPUTE ALL COSTS

FORM NO. 5

WATER DEPARTMENT METERS

Date 192 Est. No. Order No. 19813

Name	Date 192
Address	Inspected
Install Remove	Cleaned
Meter No. Make	Change gear
Location Size	Gear train
	Register gear
	Register
	Glass
Reading	Disc
Complaint	Frost clips
	Bottom case
	Intermediate shaft
	Stuffing box spindle
Date reset	
Reading	Time
Reset by	Repaired by

REPAIR ORDER FORM 5 USED AS AN ORDER FOR OUTSIDE METER REPAIR MAN

WATER RATES

First	2000 cu. ft. used per month	$ .13 per C cu. ft.	
Next	3000 " " " "	.11 " " "	
"	5000 " " " "	.09½ " " "	
"	25000 " " " "	.08 " " "	
"	465000 " " " "	.06½ " " "	
All over	500000 " " " "	.06 " " "	

1 cubic foot equals 7½ gallons.

In addition to the use of water as per above schedule there shall be a minimum charge per month on each metered service as follows:

¾	inch Meter,	per Month	. . .	$ .65
¾	" "	" "	. . .	.75
1	" "	" "	. . .	1.35
1½	" "	" "	. . .	2.00
2	" "	" "	. . .	2.50
3	" "	" "	. . .	5.00
4	" "	" "	. . .	10.00
6	" "	" "	. . .	15.00
8	" "	" "	. . .	20.00

The following stores have been authorized to collect electric, water and steam heat bills.

1. Phillips and De Vries, Penn. and Mich. Aves.
2. Monroe Drug Store, Lathrop and Michigan Aves.
3. Johnson Drug Store, 3004 E. Michigan Ave.
4. College Drug Store, East Lansing, Mich.
5. Shiffer Drug Store, High and E. Franklin
6. Taft Drug Store, 214 E. Franklin Ave.
7. Field and Moore, Maple and Pine
8. Rice & Slooter, Saginaw and Butler
9. West Side Pharmacy, Butler and Ottawa
10. St. Joseph Pharmacy, St. Joseph and Sycamore
11. Campbell Drug Store, 1145 S. Washington Ave.
12. Harvey Drug Shop, Barnes and Beal
13. Harvey Drug Shop, 1804 S. Washington
14. Britton Drug Store, 1238 S. Cedar St.
15. Broadbent Drug Store, Penn. and Main
16. Hunter's Milleta, Mich.
17. Potterville State Bank, Potterville

BOARD OF WATER AND ELECTRIC LIGHT COMMISSIONERS

LANSING MICHIGAN

E 31019 THE BEARDSLEE & BACKUS CO., DETROIT, MICH

REVERSE OF STANDARD WATER BILL
(See bottom of next page)

80 Per Cent of Water Accounted For

In spite of the fact that the city is very liberal in allowing unmetered connections on fire-hydrants for public works such as constructing pavements, flushing sewers, and building sidewalks, the department is able to account for 80 per cent of the water delivered to the mains.

Installation of Water-Measuring Devices

All through my experience in the water works business, I have made a close study of methods of measuring water. There are on the market today

LABOR

HRS. AT

" "
" "
" "
" "
" "
" "

MATERIAL

INSTALLED		REMOVED

Account No._____

Name _____

Address _____

Meter No._____ Size_____ Make _____ Location_____

Present Reading_____ Previous Reading_____

If meter cannot be read state why:_____

By_____

FACE OF SLIPS CARRIED BY METER READERS AND FILLED IN IF UNUSUALLY HIGH OR LOW READINGS ARE FOUND

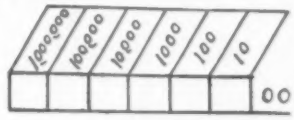
(On the back of these slips is printed Form No. 11, shown in the next column)

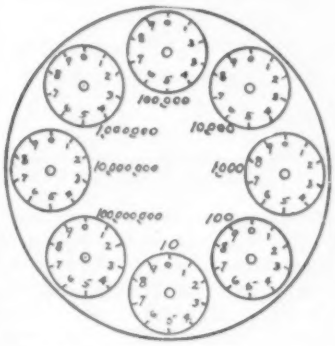
Form No. 11

Date_____

Name _____

Address _____





Verified by _____

ROUTE No._____

ACCOUNT No._____

DATE_____ 19____

On account of your absence our meter reader was unable to read your WATER METER; in order that we may have a record of the meter reading, please indicate on the dials the position of the hands on the meter and mail this card TODAY.

100,000 10,000 1,000 100 10

NOTE:—If meter has round dials, mark above; if straight register, mark below.

NAME_____

ADDRESS_____

FORM 16-A

POST CARD LEFT BY METER READER WHERE HE CANNOT OBTAIN ADMITTANCE

BOARD OF WATER AND ELECTRIC LIGHT COMMISSIONERS
OF THE CITY OF LANSING, MICH.
DEPARTMENT OF WATER

DAY NO.	PRESENT READING	PREVIOUS READING	CONSUMED	GROSS	DISCOUNT	NET BILL

PREVIOUS BILLS PAST DUE, NO DISCOUNT

TOTAL AMOUNT DUE

WHEN REMITTING BY CHECK, KEEP THIS PART OF THE BILL AND SEND US CASHIER'S COUPON. YOUR CHECK IS A RECEIPT.

NOTICE TO— **LAST DISCOUNT DAY**

FOR WATER SUPPLIED TO DAY OF PRESENT READING. MAKE CHECKS PAYABLE TO W. B. KIRBY, SECRETARY. FAILURE TO RECEIVE A BILL DOES NOT ENTITLE TO DISCOUNT. ENCLOSE POSTAGE IF RECEIPT IS DESIRED.

CASHIER'S COUPON

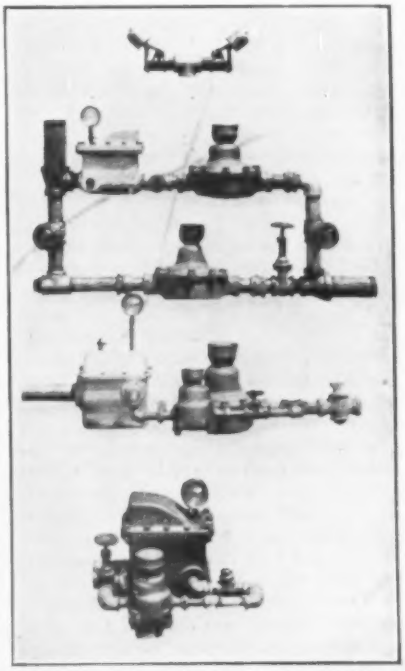
FACE OF STANDARD WATER BILL USED BY THE BOARD OF WATER AND ELECTRIC LIGHT COMMISSIONERS, LANSING, MICH.

(The Water Rates shown on the opposite page are printed on the reverse of this form)

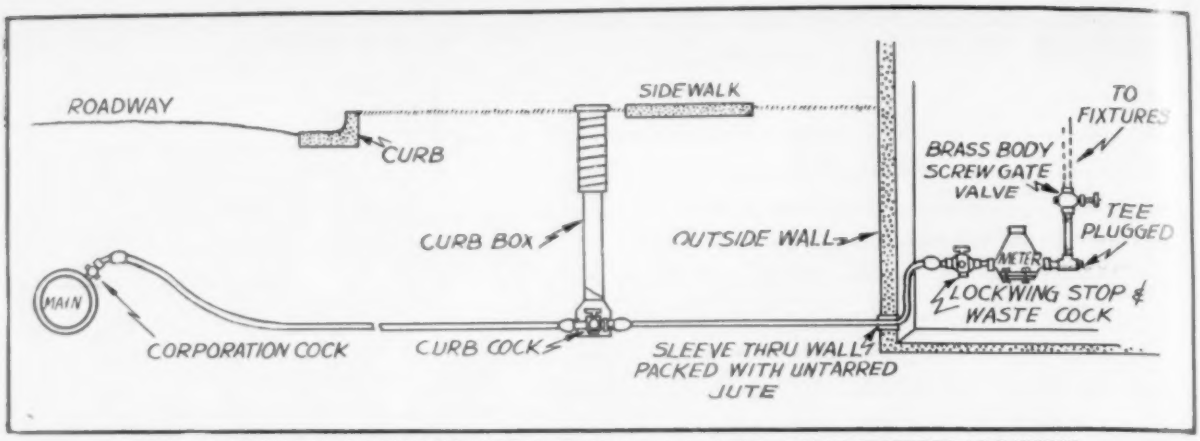
various makes and types of measuring devices, some of which are better than others, but in my opinion there has never been developed any too satisfactory a method of measuring large flows of water.

So many different things enter into this, such as location, pressures, analysis of water, temperatures, etc., that it is practically impossible to say that any one device is best adapted under all these conditions.

One of the greatest setbacks is the



COMPOUNDING VALVE AS DEVELOPED AND INSTALLED BY L. E. HACKETT IN LANSING



SCHEME OF SERVICE CURB COCK AND METER SETTING FROM MAIN TO HOUSE FIXTURES AT LANSING

cost of purchasing equipment for measuring large flows. So, after much study and experiment, I have developed (and patented) a compounding valve which is very simple and compact and can be manufactured at low cost. It will cause any two meters to run accurately in tandem.

Before installing a meter on a large water service, we go to the place to be metered and determine what are the day and night flows, what is the peak demand and at what time this peak occurs and then, knowing the pressures which are obtainable at the location, figure the sizes of the meters which would best be adapted for these conditions and then proceed to construct a set-up using these meters and one of my compounding valves.

Another great advantage of this installation is that (as we do not allow unmetered by-passes of any kind) either meter may be turned off and repaired without interfering with the operation of the other one and it is not necessary for the consumer to be without water at any time. Also if conditions change it is a very simple matter to change the size of either or both of these meters to pick up smaller flows.

Another use for this compounding valve is to put it in place of the regular check valve on an unmetered fire service and by-pass a meter around it to detect illegal use of water through the service.

U. S. Supreme Court Deals with Important Utility Questions

TWO cases of unusual interest involving public utilities have recently been decided by the United States Supreme Court. The first of these had to do with the Interborough Rapid Transit Company of New York City, which for many years has operated one group of city-owned subways under contracts which specify a 5c fare and which have been considered binding in all respects, until the company recently claimed that the New York Public Service Commission Law of 1907 permits the fare to be changed by the state Transit Commission if the latter body finds it unreasonable. The company applied to the Transit Commission for a 7c fare, claiming that the 5c fare provided insufficient return, but even before the Transit Commission rendered its decision the company applied to the Federal Court for an injunction restraining the Commission or the city of New York from interfering with the collection of a 7c fare. This injunction was granted by the Court, but a stay was obtained from the United States Supreme Court and the case was argued before the latter body.

On April 1 the eagerly-awaited decision of the Court was rendered by Justice McReynolds, and was a sweeping denial of the company's contentions and a rebuke to the lower court for granting the injunction. It was held that the matter should have been taken to the state courts, as the Transit Commission was ready to do, and the company was declared not even to have made out the case for confiscation which it claimed was taking place under the 5c fare. In its efforts to prove this the company linked the unprofitable elevated with the prosperous subways, including city and company subway property together, and had claimed that an 8 per cent return should be granted on all of this.

Although its exact scope is in dispute, the decision is heartening to cities in general as an aid in discouraging the all-too-common practice of utility companies' obtaining Federal injunctions without submitting to the jurisdiction of state courts and commissions, and also in the encouragement which the decision gives as to the power of cities to make valid contracts with utility companies.

The other decision is the long expected one in the so-called O'Fallon case, where the valuation by an Interstate Commerce Commission of the St. Louis & O'Fallon Railway Co., for the purpose of determining excess earnings, subject to recapture, was opposed by the railway. This suit, which was briefly discussed in THE AMERICAN CITY for July, 1927, at page 40, and January, 1928, at page 15, was regarded as a test case on the theory of valuation. The Commission very ably upheld, in effect, the principle of actual investment as the proper basis of valuation for rate making, other than for land. The Supreme Court in its decision, by Justice McReynolds, held, however, that the reproduction cost of railroad properties must be taken into consideration and given some weight, although no rule or suggestions were given as to how much this weight should be. Justice Stone, in dissenting, stated that if full effect were to be given to it, the railroads would now have a value of $40,000,000,000, according to the commission and "we would arrive at the economic paradox that the present value of the railroads is far in excess of any amount on which they could earn a return. If less than full effect may be given, it is difficult for me to see how, without departure from established principles, the Commission could be asked to do more than it has already done—to weigh the evidence guided by all the proper considerations—or how, if there is evidence upon which its findings may rest, we can substitute our judgment for that of the Commission."

This decision, while in the railroad field, is highly interesting and important in regard to urban utilities, although its main effect seems to be to continue the chaotic condition as to valuation which has long existed. The wording of the Transportation Act of 1920 is made the basis of the decision and it is interesting to conjecture what might happen if Congress should amend this act so as to eliminate reproduction cost from consideration or at least make actual, prudent investment the controlling basis. The Court does not come out as flatly for reproduction cost on its own merits as it did in the Indianapolis Water Case decision of Justice Butler (see THE AMERICAN CITY for March, 1927, page 376). The general tenor of the decision, however, is such as to discourage the idea that the Court may be ready to look upon valuation in a different light, aside from the fact of there being three dissenting justices—Brandeis, Holmes and Stone. An incidentally important effect of the decision is that one of the great advantages of municipal ownership, namely, freedom from the vagaries of valuation, continues in unabated strength.

Sanitation of Tourist and Vacation Camps

By ELMER W. CAMPBELL, D.P.H.

DIRECTOR, DIVISION OF SANITARY ENGINEERING, STATE DEPARTMENT OF HEALTH, AUGUSTA, MAINE

As the days become warmer in the Spring and the sun climbs higher each day, the thoughts of the city dweller turn to the pleasures of outdoor life, and visions of Summer camps are conjured in the minds of thousands of boys and girls and their parents. Many will be thinking of the automobile camps, or tourist camps, while others will be thinking of recreational camps located in the lake regions or in the mountains where they may go and spend the vacation period.

Whatever type of camp may be in mind, there are certain characteristics common to all which should be considered. These may be collectively considered under the term of "camp sanitation."

The tourist camps have largely sprung up in the last decade to satisfy the demand of the increased traveling public as a direct result of the extension of good roads throughout the country, and the higher development of the automobile industry. Hunting and fishing camps have likewise been increasing in numbers, although many of them have been in operation in the wilder sections of the country for many years. Boys' and girls' recreational camps, starting with a single camp in New Hampshire in about 1881 for boys, and a camp in Maine in 1902 for girls, have likewise increased in numbers until there are over two hundred of these types of camps in Maine alone. Many of the other states have a large number of these camps located within their borders.

A Suitable Location

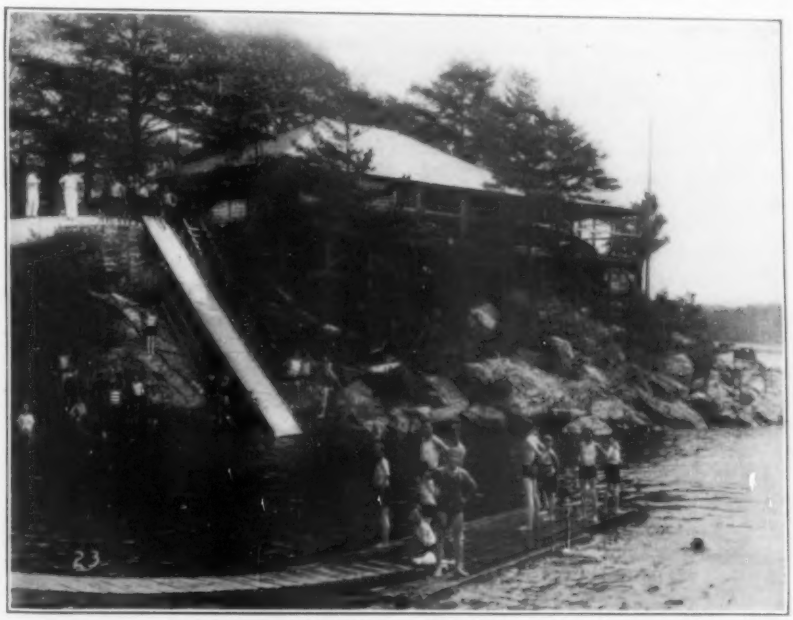
One of the first and most important points in camp sanitation is the location of the camp, for it is only by securing a suitable location that proper water-supplies, sewage disposal, drainage, etc., are made possible without necessitating expensive alterations and improvements. Camps should be favorably located on high ground and preferably with sandy or gravelly soil. The general topography should be such that proper sewage disposal can be maintained without causing pollution to any source of water-supply or to any swimming beach. The site should be remote from swamps and wet areas, so that the ground can be readily drained during wet weather and also, by keeping the ground dry and avoiding the accumulation of ponded water, mosquitoes may be prevented from breeding and causing annoyance to the occupants. Camps should be so situated that there will be ample opportunity for the sunshine to dry tents, clothing, etc., which will not be the case if there are too many shade trees and the underbrush is not cleared out and kept cut down.

Protecting the Water-Supply

The source of water-supply for domestic, culinary and drinking purposes should be absolutely beyond the reasonable limit of suspicion, as demonstrated by a careful survey of the watershed and by an analysis of the water. Properly protected springs and wells may furnish safe water, but in many instances will not give a sufficient amount for the needs of a large camp. Many camps will have two sources of water-supply—one from a well or spring which has been found to deliver a safe water, and the other probably from a lake or stream used for domestic purposes only and not for drinking. In cases when the latter sources of water-supply are provided, it is usually desirable to install some method of purification such as treatment with hypochloride or chlorine to sterilize the water. When this is done, the water frequently may be used for drinking as well as for other usual purposes. If the water is cooled for drinking, it should be done either in double-compartment tanks where the ice cannot come in contact with the water, or the water coils should pass through an ice box. In this way all danger of contamination from dirty ice will be eliminated.

Sewage Disposal or Sanitary Privies

The proper method of sewage disposal depends to a considerable extent upon the location of the camp, the size of the camp, and the permanency of the camp site. If possible, it is highly desirable to have flush toilets of adequate numbers, which, of course, require an adequate water-supply for flushing. If flush toilets are not practicable, there are types of chemical toilets which are satisfactory, especially for the smaller camps. In such cases it is necessary that a suitable system of sewage disposal be provided. These systems should be located where they will not cause pollution to any water-supply or swimming beach and in no way endanger the public health. This may be accomplished: (1) by connection to a city sewer system; (2) by treatment in a septic tank and subsurface irrigation of proper design; (3) by tank treatment with the disposal of the effluent in a large body of water so that (a) no water-supply is polluted, (b) no nuisance is created, (c) no bathing beaches are contaminated, (d) no public health is endangered in any other manner; (4) by a cesspool that in no way endangers the water-supply or is a nuisance, although this method is seldom recommended; (5) the discharge of raw



TYPICAL SWIMMING COVE AT BOYS' LAKE CAMP

Many boys' camps maintain a site like this chiefly for the more experienced swimmers and divers, and a shallow swim with sandy beach for the youngsters and beginners

GIRL CAMPERS ENJOYING LUNCH ON A MOUNTAIN TOP

sewage into lakes and streams should not be approved excepting under the most unusual conditions.

In less permanent camps it may be found more practicable to provide sanitary privies, so constructed that none of the contents may be exposed to insects or small animals, and so situated and constructed that there will be no possibility of polluting neighboring wells or springs which are used as sources of water-supply. Privies should be maintained in such a manner that no nuisance on account of odors may be caused to the inhabitants of the camp or vicinity. In the case of such types of privies—that is, those where the contents are removed and carried away—care should be taken as to the disposal of the contents in such manner as to prevent pollution of water-supplies or garden truck, and the contents should be covered to prevent spreading of diseases from insects and small rodents.

Ashes, Garbage and Rubbish

Refuse which naturally collects around a camp usually consists of three types—ashes, garbage and rubbish. Of these, the ashes may be used for filling outside the camp area so as not to cause an unsightly condition. Unless the garbage can be disposed of immediately, it should be stored in galvanized iron cans and emptied at least once a day. These cans should be thoroughly cleaned after each emptying, and the place where the cans are kept should be kept neat and clean so as not to collect flies, and preferably should be kept within a screened area. Disposal of garbage may be by removal from the premises and burying with a covering of at least a foot of earth immediately after dumping. In this way no breeding-place for flies will be created, rats will not be attracted, nor will it become a nuisance by putrefaction. Perhaps the most satisfactory way of disposing of the garbage is by feeding to hogs or chickens. This should be so conducted that the amount fed is consumed at each feeding, and the feeding-place should be raked and cleaned at least once each day and the remaining refuse disposed of by burial or incineration. Another method of garbage disposal which has been found to be satisfactory is by incineration; this is very practical at the larger camps where a suitable incinerator can be located at a point where it will not cause a nuisance in the vicinity. Rubbish should be kept picked up in order to have a clean and orderly appearance at the camp, and also to prevent paper and cans which have been in contact with food from becoming breeding-places for flies. This accumulation should be stored in metal containers and disposed of daily by incineration at a suitable place. After burning, the metal remaining from the tin cans, glassware and other non-combustible material should be removed and dumped with the ashes. Care should be taken not to allow refuse to be thrown on the ground in the vicinity of the camp and thus destroy the attractiveness of the camp grounds.

Protection from Flies and Mosquitoes

When considering the sanitation of summer camps, special attention needs to be given to the provisions for handling and storing foods and to protection from flies and other insects. Kitchen and dining-room windows and doors should be screened to exclude flies and mosquitoes, and no food should be served in unscreened dining-rooms. The ice-box should contain two compartments, one for milk and dairy products and one for other foods, in this way preventing dairy products from absorbing undesirable odors from meats and vegetables. All buildings should be kept clean and well ventilated and lighted and of pleasing appearance. The indoor walls should be such as to be easily kept clean. Persons handling foods, such as cooks, waiters, etc., should be required to have a certificate from a physician showing that they are free from infectious diseases.

All practical means should be taken to destroy the breeding-places of mosquitoes, as they are very annoying and may cause much discomfort, even if the camp is located in northern states where there is no menace from malaria. The sleeping quarters should be equipped with suitable mosquito netting, so that the sleepers will be protected from the mosquitoes at night.

Bathing Beaches

Bathing beaches preferably should be located where there is a sandy or gravelly bottom with a gradual slope from the shore, and the water should be absolutely free from any sewage and should not be used to such an extent that the bathing load is exceeded. No litter or unsightly material should be tolerated on the shore or in the water

DINING-ROOM SCENE AT A SUMMER CAMP FOR BOYS
Only a clean, well lighted, well ventilated and tightly screened room should be used for mess hall

and there should be no free floating material to endanger the bathers. It is desirable to have a guard whenever possible, especially where children are bathing.

A matter of great importance in the boys' and girls' camps, but which is not necessary for a tourist camp, is an infirmary or isolation ward, which should be a separate building in which any child may be isolated who is ill with an infectious disease, or who may have been exposed to such contagion.

If the principles which have been stated above are carefully followed, any camp, wherescever located, will be clean, sanitary and attractive, and it is necessary to bear only three essential things in mind—(1) proper location, (2) safe and adequate water-supply, (3) safe and efficient disposal of wastes.

EDITORIAL NOTE.—The Education Division of the National Safety Council, 1 Park Avenue, New York, has just issued a 12-page "Bibliography of Camp Safety, Hygiene and Sanitation."

Maintaining Motor-Propelled Fire Apparatus

By ARTHUR H. WILSON

FROM time to time manufacturers are asked what procedure they would recommend to insure the greatest degree of reliability in the performance of a piece of motor fire apparatus: as a fireman put it, to have the apparatus "rarin' to go when the bell hits."

Obviously, the answer is more complex than the question. There is no single act which will insure that a motor fire engine can be relied upon to respond when the gong rings, and, what is of even greater importance, continue to operate en route to the fire and after arrival, in a manner that will produce the maximum of results at a minimum of risk to those riding on the apparatus and to the citizens along its path of response. Rather, reliability of performance is dependent upon close attention to a multitude of details that go to make up competent and complete maintenance.

Most large departments maintain repair shops under competent supervision, with a force of skilled mechanics at hand to perform all major repair work, as well as to make periodic inspections of the apparatus in an effort to anticipate trouble before it occurs. The larger apparatus manufacturers maintain a force of inspectors in the field for the same purpose. Many serious accidents have no doubt been averted by locating and correcting trouble before it becomes serious. This system is highly commendable, but of itself is insufficient to insure the best of results.

The Driver's Responsibility

By far the largest burden of responsibility rests upon the individual operator. The man who drives a powerful piece of motor fire apparatus in response to an alarm has under his control a sizable investment in the apparatus itself. But of even more importance, is his grave responsibility in having the lives of other firemen, and of citizens, dependent upon his cool judgment and skill.

There is no need for a treatise on the subject of driving a fire-engine, as the importance of selecting capable men of sound judgment is too well known to admit of discussion. Much may be said, however, on the subject of maintenance, which is of equal, if not of greater, importance. A relatively poor driver of an engine in good condition, could make a comparatively safe fire run by traveling at a moderate rate of speed. But the most skilled of drivers will come to grief if the apparatus he is driving has badly worn or improperly adjusted brakes, lost motion in the steering gear or any of the many disarrangements which are sure to develop on a neglected engine.

The routine inspections usually made by the department mechanics or the manufacturer's inspectors are insufficient to insure that all derangements will be detected promptly enough to abort trouble. The time elapsing between inspections is ample to permit the minor trouble of to-day to become the major trouble of to-morrow. Mechanical troubles are like fires; most fourth-alarm fires could have been put out with a hand extinguisher if caught *soon enough* —and similarly, almost every serious case of trouble on a piece of apparatus could have been prevented by the tightening of a nut or the lubrication of a part, if done *soon enough*.

Material to Be Studied

Eternal vigilance in the matter of inspection and lubrication are vital to the successful operation of a motor fire engine. A comprehensive knowledge of the construction and operation of the apparatus is essential, and this can best be obtained by thoroughly studying the instruction book provided by the manufacturer of the engine. Operators of motor pumping-engines should also familiarize themselves with the fire-stream tables and other useful data contained in the Red Book of "Fire-Engine Tests and Fire-Stream Tables," published by the Committee on Engineering and Fire Prevention of the National Board of Fire Underwriters.

The instruction book of the apparatus manufacturer should be studied until the apparatus operator is thoroughly familiar with every detail of operation and maintenance. Particular attention should be paid to the lubrication schedule, which forms a most important part of these textbooks, and this schedule should be followed religiously in caring for the machine. Remember, oil is cheaper than machinery, and, with the possible exception of the magneto, generator, distributor and starter, too much oil never hurt any machine, while too little has been the ruination of many.

Keep the apparatus clean, not only outside but inside and underneath as well. A clean machine seldom gives trouble. The reason for this is twofold; dirt does not get a chance to get into bearings and other working parts, and the men in going over the machine as thoroughly as is necessary to keep it clean, will discover any loose nuts or deranged parts so that they may be rectified promptly.

Functions to Be Performed

Establish a routine inspection system on your machine. On a certain day of each week go over certain parts, timing yourself so that *every part* receives an inspection at least *once a week*. In doing this work, don't satisfy yourself that a nut or screw is tight by merely looking at it; put a wrench or screw driver on it and tighten it. Remember the *most important* nut on a machine is the *loose* one. While every nut and screw on the machine is important, too much attention cannot be given to those holding the front and rear axles to the springs, the spring shackle bolts, the brake mechanism and steering gear. About the motor, the intake and exhaust manifold nuts, those holding the carburetor, the engine base, crankcase, motor support and flywheel bolts, are all important. In tightening nuts about the machine, don't overlook the ladders. Keep all ladder nuts tight, and varnish the ladders as often as is necessary to exclude moisture and prevent surface cracks.

In addition to the routine inspection outlined above, all important parts should be inspected after each run. Before leaving the machine to await the next alarm, the operator should satisfy himself that there is gasoline in the gas tank, oil up to the proper level in the crankcase, water in the radiator and battery, and correct air pressure in the

tires, if the machine be equipped with pneumatics. This last is a frequently neglected detail that may cause serious trouble. Air in the tires should be tested with a gage and maintained at the proper pressure. Don't guess at the pressure, as with large casings the pressure may be down 20 pounds before it is readily discernible to the eye. An under-inflated tire is dangerous, as it is more susceptible to puncture and more apt to roll off on a fast turn, and will cause the machine to steer hard and pull to one side if on a front wheel.

Pumping-engines should be connected to a hydrant and operated at least once a month, unless pumped at a fire in the interim. This gives the engineers valuable experience in the handling of the machine and at the same time provides a means of detecting leaks or other derangements that might develop into serious trouble later. The wetting of the pump interior is beneficial, as it helps keep the packing moist and pliable. The engine should be pumped at draft occasionally in order to keep the operators familiar with the method and to serve as a check on the condition of the pump and its accessories. A pump that will "pick up its water" promptly and operate smoothly on draft, may be counted on to pump successfully from a hydrant. At least once a year, the engine should be tested as draft for rated capacity, in accordance with the methods of the Underwriters' engineers as set forth in the Red Book. If the engine fails to deliver its rated capacity, steps should be taken to determine the source of the trouble and correct same.

Aerial ladders should be hoisted and operated occasionally, both by the hand and by the automatic methods. This will keep the operators familiar with the raising devices and also insure that everything is in good condition.

Don't permit familiarity to breed contempt; show the same degree of interest and take the same care of your machine after it has been in service five years that you did the first five months after it was delivered. Your reward will be a machine that will perform better its fifth year of service than it did its first.

If at any time you are confronted with a problem of operation or maintenance not covered by the instruction books or by the verbal instructions of the manufacturer's service men, communicate with the service department of the concern that built the machine. They will be glad to contribute any information desired, as they are anxious at all times to see their equipment give the best possible service, and they realize that a well-informed operator is one of the prime requisites to successful performance.

EDITORIAL NOTE.—Some recently compiled data on municipal repair shops for fire-department motor apparatus in New York State will be found on page 21.

Picking and Training Playground Directors

A YOUNG man was employed last June by a city of about 60,000 to demonstrate the value of playground and recreation work. For the remainder of the year, he was allowed only $300, other than his salary, to conduct his program. One of the first things he did was to teach a recreation course at the university located in the city and to use his students as volunteer workers. This enabled him to operate five playgrounds, to organize baseball and athletic leagues, and to carry through other types of activities. In all, he secured the help of 38 volunteer workers.

Since he arrived, a bond issue of $750,000 for parks and playgrounds, which had been brewing, has been passed and he has been allowed a budget for 1929 of $12,000 for activities alone.

A young woman was employed in a state reformatory to conduct a recreation program financed for a year by a friend of the institution. So successful was her demonstration that it resulted in a state appropriation to carry on the work permanently.

These two were graduates of the National Recreation School conducted by the Playground and Recreation Association of America in New York City. Their experience in the first year out of the school illustrates the solid achievement possible with people who have added thorough training to natural aptitude for recreation leadership. They are also examples of the new day in the recreation profession.

Other Abilities Than Handshaking Required

The time has passed when to have shaken hands with an alderman is sufficient qualifications to direct a playground system. Several years ago the P. R. A. A., closely in touch with the pulse of public recreation throughout the country, realized that a school of a graduate character was necessary to make available a constant supply of high-grade men and women capable of serving as assistant recreation directors in large systems, directors in small systems, and heads of special departments such as athletics, girls' work, and dramatics. For three years it has hand-picked from universities and colleges the best seniors in scholarship, athletics, extra-curricular activities and all-'round leadership it could obtain, and has put them through a stiff, practical, nine-months course in conducting public recreation. For their instruction it has assembled the ablest teachers and special lecturers it could secure from successful administrators of recreation and from faculties in the leading universities. Some of the school faculty are: Alfred G. Arvold, founder of the little country theater, Agricultural College, Fargo, N. Dak.; C. J. Atkinson, Director, Boys' Club Federation; Dr. William Burdick, Director of the Playground Athletic League, Baltimore; Peter W. Dykema, Ph.D., Columbia University; Miss Dorothy Enderis, Superintendent of Education in charge of Recreation, Milwaukee; Charles H. English, Recreation Manager, Playgrounds Association of Philadelphia; Lee F. Hanmer, of Russell Sage Foundation; Prof. George E. Johnson, of Harvard University; A. E. Metzdorf, Y.M.C.A., Rochester, N. Y.; John Nolen, city planner, Cambridge, Mass.; Jane Deeter Rippin, Director of the Girl Scouts of America; Captain Charles Scully, American Red Cross; Charles F. Smith, Boy Scouts of America; and Mrs. Eva Whiting White, Director, Community Service, Boston. George E. Dickie is Director of the school, and Arthur T. Noren Assistant Director.

The course in the school consists mainly of doing in class and out of class the things which the students will be called upon to carry through when employed. A considerable portion of the class have already had experience in directing summer playgrounds prior to graduation.

The nature of the curriculum is indicated in the following partial list of subjects: games; athletics; social recreation; handcrafts; camping; special activities such as Boy Scouts, Girl Scouts, Camp Fire Girls, etc.; program making; park recreation problems; city government problems; problems of recreation finance; publicity problems; school recreation problems; and organization and administration.

Placement of Graduates

On the completion of the course, the Association's personnel bureau helps in the placement of the graduates in recreation positions. Under this combination of careful selection, thorough training, and discriminating placement, the plan naturally is bearing good fruit. One notes several of the graduates employed as assistant directors in large systems, several directors in small or recently established recreation programs in small cities, and others as directors of athletics and other special activities or departments.

One man of this year's class, which completes the course at the end of May, has already been employed as assistant recreation director in a large county recreation program. Another has been made director in a small city. Another has been chosen as assistant director of a foundation in New York City.

While the Association established the school primarily to train leaders for public recreation, private recreational organizations have also sought their services. The personnel bureau has taken a liberal view in putting the graduates in touch with opportunities in connection with large community houses, recreation departments of corporations, and other groups desiring workers. The school has thus become a training center not only for public recreation but for recreational agencies at large.

WEAVER PANGBURN.

Surmounting Difficulties in Paving a Main Traffic Street

By ERNEST L. GUYER
City Engineer, Newcastle, Ind.

FULLY ten years ago, South Fourteenth Street, in Newcastle, Ind., was in dire need of repair. It was the general thought of this city, and especially the property owners, that the traction company was responsible for the failure of the old pavement, and the first question that came up was to have the traction company resurface the street. Of course, this utility, feeling that because of the small amount of time it used the street there must have been some other cause for the failure, made an investigation, and reported to the city that the bus line was equally responsible.

Fourteenth Street is a main, heavy-traffic street between the industrial section and the railroad freight yards. It carries two bus lines and approximately two hundred cars per hour. The street itself is narrow. At a council meeting at which a large number of property owners were present, the council was advised to widen the street, but the property owners objected because it had taken forty years to grow the beautiful trees that were in the parkway space. It is also State Highway No. 3, and carries the north and south traffic on the eastern side of the state.

A few years ago, Professor Petty, of Purdue University, was called by the city to make a survey of the street, and report on the responsibilities of resurfacing. The report was, in short, that it would be useless and money badly spent to resurface the street with its then present base. About four years ago, the city passed resolutions to repave the street and informed the traction company that it would be charged for that part of the pavement between the ends of the ties, and an injunction was gotten out against the city that was never decided.

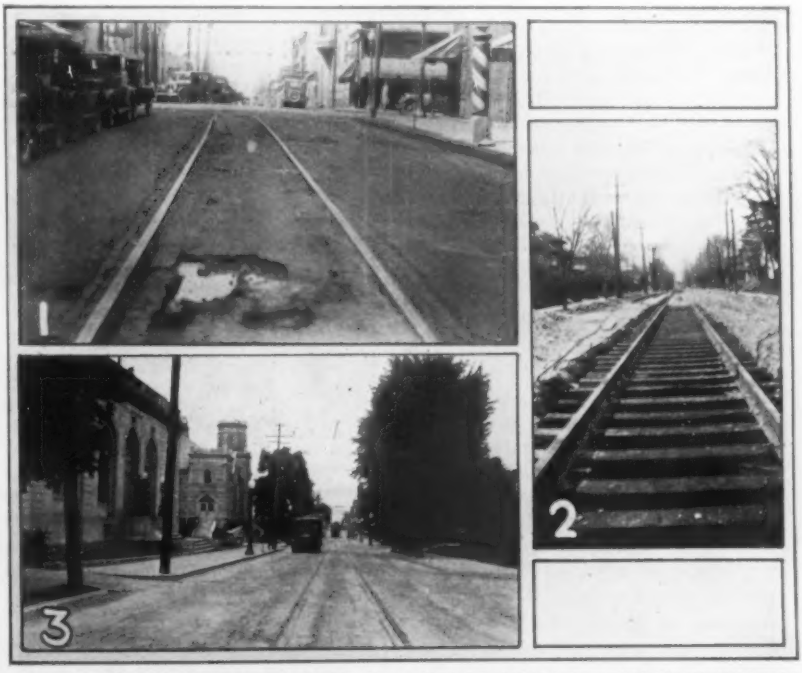
In the spring of 1928 is was thought best to have a meeting of the traction officials and the property owners, hoping that some good might result. When one side began to see the other's troubles, they got together and agreed to repave. The substance of this meeting was that the traction company was to put 8 inches of concrete beneath the ties and around the ties, bringing the concrete to the bottom of the subbase of the pavement. They were also to replace old ties and weld the joints, but later, when the traction company's engineer and the City Engineer were drawing the plans for the street, they thought it advisable to put some sort of expansion joint on both sides of the rail; all this, of course, to be done at the expense of the traction company. The company decided to use Carey expansion joints and put in track drains at all low points. The Carey expansion joints used against the rails were shaped like the side of the rail, and fit close, leaving room at the ball of the rail for the flange of the car wheel. It is 2 inches thick, and acts as a cushion. The property owners agreed to pay for the pavement as though there were no track on the street. After the meeting, the property owners decided to pave with a 6-inch plain concrete vibrated base and a 2-inch surface of asphalt. This was laid at a price of $3.10 per square yard.

Utilities Make Changes Prior to Repaving

We have in Newcastle an understanding with all utilities that when a petition is granted by the council, they are to put in their pipe line immediately, and the street will be improved the following year. This serves two purposes: first, in this way, there will be no two contractors at work on the same street at the same time, necessarily in each other's way; and, second, it gives all trenches a year to settle, preventing to a certain extent the future cracks and bad places in the pavement. Fourteenth Street was blessed with plenty of trenches. The Interstate Public Service Company put a 10-inch line the full length of the street, with house connections at every house, and the city Water Department put a 6-inch line part of the way, so during the summer preceding the improvement, the street was pretty well torn up.

Adequate Inspection Provided

Don Walker, the traction company engineer, and the writer agreed that we were to have professional inspectors throughout the entire work on the street, so cylinders were made of concrete of the track base as well as the pavement base. The H. C. Nutting Co., of Cincinnati, Ohio, was employed. They furnished the cylinders, we made the samples, and they cured and tested them. During the laying of the asphalt, they had two men on the job, one at the plant, and another on the street. It was their duty to see that the work tallied with the specifications, which they did. The cylinders were taken at no specified time, but at least one in a morning and one in



FOURTEENTH STREET, NEWCASTLE, IND., BEFORE AND AFTER ITS REJUVENATION
1. Condition of the street before resurfacing was undertaken. 2. A section of the street-railway tracks during construction. 3. The finished job

an afternoon during each day's operations. The track foundation was to be laid as much as possible without any traffic. This could be readily done, except that part near the traction station and freight yards, where the concrete base had to be laid under traffic. The traction company, to get the track base in without any traffic, laid a temporary track on the old pavement just to one side of the track and then ran the cars and traffic over this temporary track until the base had settled and cured. It was done without very much expense or trouble because swinging the power cable was not a hard matter, and the track was laid very fast with a few men. All it practically required was some dirt to hold it in place. This worked out very satisfactorily both to the city and to the traction company. At the freight yards one gallon of calcium chloride was added for each bag of cement used. This was done around the special work and on the street where it was impossible to keep the car traffic off. Lone Star cement was used, and tests after the work had been in seven or eight days showed very good concrete.

Paving Operations

The Mid-West Asphalt Co. was the contractor on the job, with P. E. Latchen as superintendent of construction. The contractor used Universal portland cement and Trinidad asphalt. The base of the pavement was put in and allowed to set twenty-one days before the asphalt was put on, and on inspection, it was found to crack at about 30-foot intervals. While the concrete base was being laid, it was vibrated by machines of the Vibrolithic Concrete Co. This was done by placing side by side two 2-inch thick boards with holes bored in them from 8 to 10 inches apart, and ribs on the bottom side of the board that would make indentations or grooves in the pavement ½-inch deep, 1½ inches at the top, and 1 inch at the bottom. The vibrating machines were then run over these boards until the surplus water was taken out of the concrete and all aggregate had found a place. It was noticed that the concrete would compact about ¾ inch under vibration. So, to get the full 6 inches in thickness, we were required to spread 6¾ inches of plain concrete. The fact that sold the property owners on the Vibrolithic concrete was that a test by the Bureau of Public Roads showed it to have a 33 1/3 per cent greater strength than plain concrete. The cost of the Vibrolithic process was 30 cents per square yard.

Driveway Entrances

In Newcastle there is an ordinance requiring that every property owner who wishes the head of the curb left off for a driveway must apply at the City Engineer's office for a permit. This permit is made out in triplicate, one retained at the City Engineer's office, one given to the property owner, and one given to the contractor. The contractor, before the pavement is accepted, must finish the driveway. We have plans for the driveways in the office. Then we know when the street is done and ready to be accepted by the city that every portion is completed, and there is no patch work to be done in the future.

ACKNOWLEDGMENT.—From a paper read at the Fifteenth Annual Road School at Purdue University.

Tuning-Up Traffic Law Enforcement Machinery

THE rapid increase in street traffic throughout the country has placed upon the courts a new problem arising from vast increases in cases to be handled and from a new type of violations to which enforcement machinery has not been adequately adapted. The assignment of traffic cases to different courts within the same city where they come up in turn with other kinds of law violations, results in a serious lack of uniformity in handling and frequently in the failure of judges to differentiate between serious and minor cases. This discourages police activity and lowers the general morale of traffic law enforcement.

The congestion of the courts by traffic cases is generally resulting in delays in court action and often in wholesale discharging of traffic cases without hearings, to clear the court dockets. Many of these cases are of minor importance in comparison with other kinds, but are of sufficient significance to warrant businesslike handling to insure the maintenance of public respect for traffic regulations.

Traffic cases should be segregated from others in court treatment to permit of specialization in, and concentration on, their handling. This should be obtained by special courts exclusively for the hearing of traffic cases in cities where the number is sufficiently large to warrant it, and special sessions of regular courts devoted exclusively to traffic cases in smaller cities. Either method serves to segregate these cases from others for more uniform and expeditious treatment.

Traffic Courts and Violations Bureaus

is the title of a forthcoming pamphlet of the National Safety Council, portions of which comprise the accompanying article. Other sections of the pamphlet discuss among others, problems of court congestion, the distinction between minor and major violations, the specialized traffic court for handling minor violators who plead guilty, various types of traffic violations bureaus, and methods of safeguarding court machinery. The full text of a suggested ordinance providing for a traffic violations bureau is given, and also forms of reports on activities of such bureaus and traffic courts.

This pamphlet on "Traffic Courts and Violations Bureaus" is obtainable from the National Safety Council, 108 East Ohio Street, Chicago, Ill.

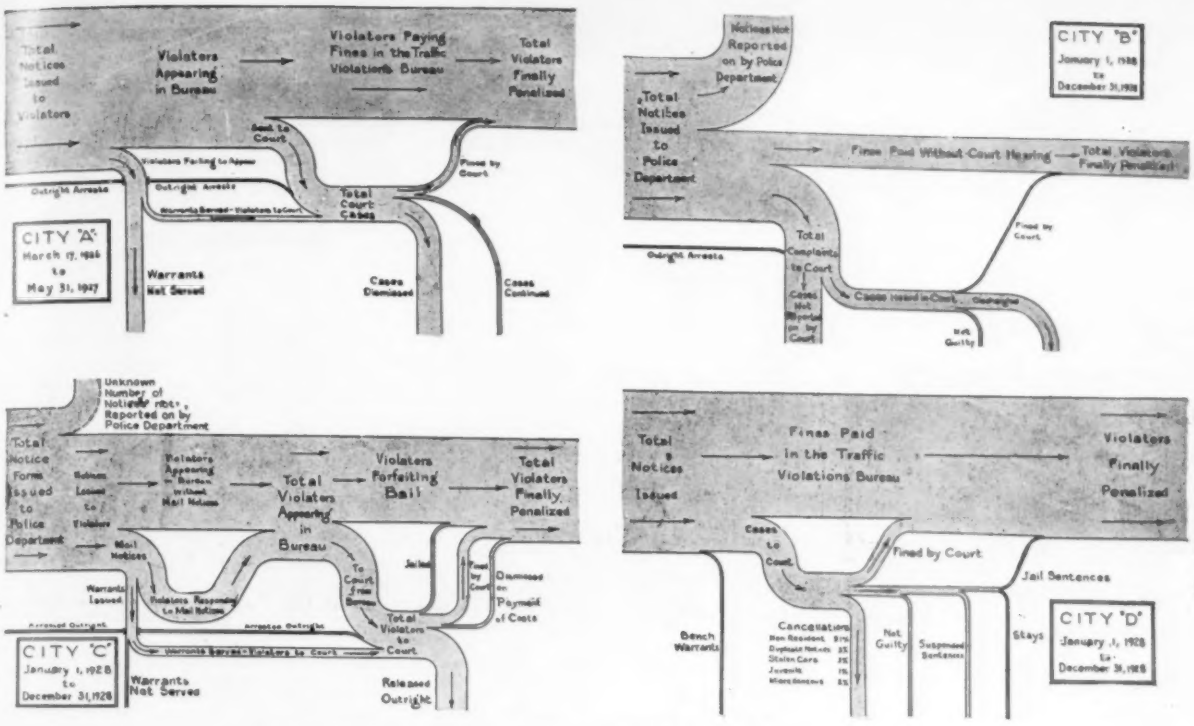
Giving Traffic Law Violators an Opportunity to Acknowledge Their Guilt

Where means are provided for handling the clerical details, 50 to 90 per cent of all traffic law violators will acknowledge their guilt and pay fines without the formality of a hearing in court. These clerical facilities, commonly called traffic violations bureaus, relieve judges for more thorough judicial consideration of serious traffic cases. They should be operated as parts of the court organization.

The state law usually governs to some extent the character of the traffic violations bureau that is adapted to any given city. But bureaus in all cities should be uniform in that they should have no powers to adjudge guilt or innocence or to modify the schedule of fines to be assessed. Cases requiring judicial decisions should always be sent to the courts.

Practically every city of more than 15,000 population has a sufficient traffic enforcement problem to necessitate specialized traffic court procedure and the handling of minor cases in some form of traffic violations bureau, for speedy and equitable treatment.

The successful administration of traffic courts and traffic violations bureaus should be safeguarded by the maintenance of adequate records regarding the disposition of all traffic cases for official and public information. A strict accounting should be made of all summonses issued, to safeguard against their cancellation by unauthorized officials. The power to discharge a case without penalty should rest only with the judge.



THE EXPERIENCE OF FOUR CITIES WITH TRAFFIC VIOLATIONS BUREAUS

How to Establish a Traffic Violations Bureau

The best practices of traffic violations bureaus in more than a dozen cities are summarized here:

A bureau should be part of the court, and under the jurisdiction of judicial officials. Let this fact be clear, whether the bureau is located at the court-house or at police headquarters, whether it is a bail-forfeiture bureau or one where the violator pleads guilty and pays his fine. In practice, most large and well-established bureaus are part of the court. One of the best bureaus, that at Kansas City, started under the police, but later was transferred by city ordinance to the court.

The type of bureau to be established should be decided on the basis of state law and should let the violator plead guilty and pay a fine, if such action would be legal. This type may be established when state laws permit the offender to waive trial or be represented in court by proxy.

If state laws are indefinite, a ruling of the court or a city ordinance may be necessary to authorize the bureau. Only when state laws specifically require every violator to appear in person, should a bail-forfeiture bureau be resorted to. If such action is necessary, an effort should be made to change the state law to permit the more desirable type of bureau.

Which cases are to be handled by the bureau should be definitely decided and agreed upon by all concerned. In general, minor violations will go to the bureau and the more serious ones to the courts.

If necessary, as in North Carolina where violations of the state motor vehicle code must be tried in county courts, the bureau may be limited to violations of the city ordinance.

Decide the number of complaints which a person may settle at the bureau. For parking offenses, for example, the violator may well be allowed to settle at the bureau as many as three times without appearance in court, but for such an infraction as driving through a safety zone, an operator should not be permitted to pay a fine at the traffic violations bureau more than once.

Violators who fail to appear within the time specified on their notices and must be brought in by warrants should forfeit their privilege of paying a fine at the bureau.

A schedule of fines for first, second and third offenses should be established by the magistrate and changed from time to time as he sees fit, if this procedure is legal; otherwise the schedule may be established by ordinance, at least for violations of the municipal traffic ordinance. Violators with more than three offenses within twelve months against them should be required to appear in court.

The bureau must be strictly clerical—Its duties should be to receive fines from those who acknowledge guilt, enter the others on the court docket, and keep the necessary records. No one in the bureau (and, for that matter; no one except the magistrate) should be permitted to dismiss or discharge cases.

Fines Received.—Each violator who pays a fine at the bureau should be given a receipt which states that his case is settled. All accounts of the bureau should be audited by the city comptroller or corresponding financial official.

Records of Violators must be kept to determine whether they are to pay fines for first, second or third offenses. It is usual to keep these records for only twelve months.

Reports should periodically be made to the mayor, traffic court magistrate, chief of police, and others, of all cases which come to the bureau and the manner of their disposal. The bureau may also advantageously keep similar records of the traffic court cases and prepare a consolidated report which will indicate the activities of both courts and police.

Payment of fines in person, by mail, or by messenger should be permitted, provided the violator has signed the necessary acknowledgment of guilt and power of attorney, but mail payments should not be encouraged.

Warrants must be issued for those who do not appear on summons. In case the identity of the violator is not known, a mail notice may be sent to the owner of the vehicle, as determined by the registration number, informing him of the violation before a warrant is issued. After a warrant has been served, let the case be handled entirely by the court.

Hours of business in the bureau should be chosen to accomodate those who wish to pay. A few hours in the evening may be necessary for people employed all day. If the demand is sufficient, 24-hour operation may be desirable.

Location.—In large cities the traffic violations bureau may occupy one or more rooms in the court building, adjacent, if possible, to the traffic court. In small cities, where the bureau requires only part of the time of one clerk, it may be more conveniently located at police headquarters, where violators would naturally go to clear themselves.

It is not advisable to let city employees or the general public forget that the bureau is a part of the court regardless of where it is located.

Courtesy and Firmness.—Courtesy and firmness should be the watchword of the traffic violations bureau. Whenever any dispute arises, the violator may be politely referred to the court. Under no circumstances must the privilege of a trial be abridged either in fact or by implication.

Scheduled Fines for Traffic Ordinance Violations

The following tabulation is based on Traffic Violations Bureau charges in these cities:

Akron, Ohio
Baltimore, Md.
Berkeley, Calif.
Canton, Ohio
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Columbus, Ohio
Dayton, Ohio
Detroit, Mich.
Duluth, Minn.
Flint, Mich.
Ft. Wayne, Ind.
Grand Rapids, Mich.
Greensboro, N. C.
Highland Park, Mich.
Indianapolis, Ind.
Kansas City, Mo.
Los Angeles, Calif.
Memphis, Tenn.
Minneapolis, Minn.
Oshkosh, Wis.
Pittsburgh, Pa.
Sioux Falls, S. Dak.
St. Louis, Mo.
Toledo, Ohio

Violation	Offense	Smallest Fine	Average Fine	Greatest Fine
Failure to stop on signal of officer. *Ord.—4*	1st	$1	$3.18	$10
	2nd	3	5.10	10
	3rd	3	7.80	15
Failure to stop at automatic signal. *Ord.—9*	1st	0	2.97	10*
	2nd	2	5.50	10*
	3rd	3	8.93	18*
Failure to stop at through street.. *Code—22, Ord.—44*	1st	0	3.13	10*
	2nd	2	5.72	10*
	3rd	3	9.34	18*
Failure to stop behind street car... *Code—23 (b), Ord.—19 (b)*	1st	2	6.54	10*
	2nd	3	9.80	15*
	3rd	5	12.00	20*
Passing on left of street car..... *Code—23 (a), Ord.—19 (a)*	1st	0	7.42	25*
	2nd	2	10.77	25*
	3rd	3	14.33	25*
Passing on right of vehicle..... *Code—13 (a)*	1st	0	4.24	10*
	2nd	2	6.88	15*
	3rd	3	10.05	20*
Passing vehicle at intersection.... *Code—13 (c)*	1st	3	4.42	5*
	2nd	5	7.00	10*
	3rd	5	8.33	10*
Turning left when forbidden..... *Ord.—38½*	1st	1	3.26	10*
	2nd	2	6.08	10*
	3rd	3	11.00	15*
Turning about in mid-block.....	1st	1	4.00	10
	2nd	2	6.25	10*
	3rd	3	8.83	15*
Turning too short or wide..... *Code—17 (a), Ord.—38*	1st	1	2.63	5*
	2nd	2	5.00	10*
	3rd	3	9.13	10*
Parking opposite building entrances *Ord.—26 (b)*	1st	1	1.61	3
	2nd	1	2.91	5
	3rd	1	4.90	10*
Parking in restricted alley..... *Ord.—30 (b)*	1st	1	1.61	3
	2nd	1	2.75	4
	3rd	1	4.28	5*
Parking at angle to curb..... *Ord.—34 (a)*	1st	1	1.60	3
	2nd	2	2.91	5
	3rd	2.45	4.73	10*
Parking too far from curb..... *Ord.—34 (a)*	1st	1	1.71	5
	2nd	2	3.00	5
	3rd	2	4.86	10*
Parking double..... *Ord.—34 (a)*	1st	1	1.74	3
	2nd	1	3.12	5
	3rd	1	5.39	10*
Parking headed in wrong direction *Ord.—34 (a)*	1st	1	1.56	3
	2nd	2	2.96	5
	3rd	3	4.73	10*
Parking without lights..... *Code—66, Ord.—54*	1st	1	2.09	5
	2nd	1	3.00	5
	3rd	1	5.77	10*
Parking for sale on streets..... *Ord.—35*	1st	1	2.00	3
	2nd	2	3.42	5
	3rd	3	5.16	10*
Parking with engine running..... *Code—27, Ord.—46*	1st	1	2.40	5
	2nd	2	4.22	10
	3rd	5	5.83	10*
License plates improper.....	1st	2	4.13	10*
	2nd	3	6.16	10*
	3rd	5	9.00	10*
Pedestrian against traffic signal... *Ord.—16*	1st	1	3.00	5*
	2nd	3	5.00	7*
	3rd	5	7.50	10*
No name on commercial vehicle...	1st	3	4.00	5
	2nd	5	7.50	10
	3rd	Court	Court	Court

Code—Refers to section number of "A Uniform Act Regulating the Operation of Vehicles on Highways," National Conference on Street and Highway Safety.
Ord.—Refers to section number of the "Model Municipal Traffic Ordinance" of the National Conference on Street and Highway Safety.
*An asterisk indicates that one or more cities require the violator to appear in court without permitting settlement at the Traffic Violations Bureau.

How Can a Section of a Town Get What It Is Prepared to Pay for?

Government-By-Contract As It Is Being Worked Out in Radburn, N. J.

How can part of a town carry on a more advanced form of living than the municipality as a whole is ready to afford? In towns of all sizes the tax money just about takes care of the essentials, and the city fathers are kept pretty busy administering streets, water, schools, police and fire protection. Often there is some part of town that wants parks, playgrounds, better street lighting, more street trees, and is prepared to pay for them. How are they to be administered? Who is to collect the money, and disburse it?

By CHARLES S. ASCHER
ATTORNEY, CITY HOUSING CORPORATION

USUALLY this problem arises where some real estate subdivider with long vision plans a residential neighborhood of homes for the fairly wealthy, such as J. C. Nichols' Country Club District at Kansas City, Duncan McDuffie's St. Francis Wood, Charles H. Cheney's Palos Verdes Estates, or Edward H. Bouton's Roland Park. What these developers generally do is to let the residents organize a Homes Association, and put a charge on the land—usually a fixed amount per square foot. Or sometimes the developing company itself collects such a sum and spends it for improving the subdivision.

City Housing Corporation, the limited-dividend company developing Radburn, N. J., "the town for the motor age," has met this problem in an acute form, and has had to work out a scheme suitable not only to expensive homes owned by their occupants, but to cover a town within a town, with tenants, storekeepers, manufacturers and their employees to be affected and considered as well.

The novel features of the layout of Radburn have already been described in THE AMERICAN CITY.* What is equally novel is the complex civic unit for which "private government" has had to be provided. Radburn constitutes one-third in area of a borough having 3,200 acres of prosperous farms and some hundreds of cottages of workers from a neighboring industrial city. The population is 4,000; there are four grade schools, volunteer police and firemen, a few paved and lighted roads, no sewers, no full-time municipal officials, no assessment map, no zoning ordinance, no town plan, no health officer. Parks hardly seem a real problem in a community that is all open spaces!

*See THE AMERICAN CITY for July, 1928, p. 120; October, p. 81; November, p. 105; December, p. 148; April, 1929, p. 142.

The Tail That Will Wag the Dog

Now, all of a sudden, one company proposes to build homes for 25,000 people, to develop a trading center for the entire adjoining region, to provide for manufacture, to create a complete practically self-contained town. Twelve per cent of the 1,250 acres purchased are planned for permanent open space. From the start there are to be sewers,

concrete roads, urban street lighting, garbage collection, supervised recreation, public health work. In addition, the planners of Radburn hope to maintain the high standards of architecture and town planning set in the beginning.

Of course, when Radburn is finished, most of these activities ought to be run by the municipality. Municipal credit can finance them most cheaply, citizens are used to seeing tax money spent for purposes of this kind, the machinery for raising and spending municipal funds has a long tradition, and the taxpayer knows how and where to kick if he thinks taxes are getting too high. Moreover, if a neighbor is forgetting his neighborly duties, and is leaving garbage cans uncovered, a summons from a health officer, a prompt hearing before a magistrate and a fine, are pretty effective for jacking him up. Under a well-administered zoning ordinance, the police power provides resources against the unneighborly use of land more effective than a chancery injunction suit for violation of a restrictive covenant.

On the other hand, the courts will not yet let the police power be used to preserve standards of architectural beauty; and any zoning map which showed uses so finely interwoven as at Radburn would probably be considered an unconstitutional crazy-quilt. And spending tax money for playgrounds is a particularly hard problem for a Mayor and Council who represent not only Radburn home-owners but taxpayers owning 100-acre farms.

How Radburn's Extra-Municipal Government Will Function

As a result, the City Housing Corporation has provided for Radburn a government-by-contract to supplement the municipal government, with the hope that eventually it can transfer many of its duties to the public authorities, but knowing that some which will affect Radburn peculiarly will long remain outside the province of the borough officials.

There has accordingly been incorporated, as a New Jersey corporation not for profit, "The Radburn Association." Before the first home in Radburn has been occupied, the Trustees have appointed a Manager, and a Supervising Architect, and have already adopted a budgetary accounting system in the best municipal tradition, and a Residential Architectural Code specifying which architectural changes are prohibited, which may be made only with the Supervising Architect's approval, which may be approved by the Manager in his discretion, and which may freely be made.

The powers of the Association cover any activity for the enhancement of community life. Some it exercises directly: the parks are being deeded to the Association for administration in trust for the residents of Radburn. In some matters, such as street lighting, the Association contracts with the municipality to pay it an extra amount for the higher standard to be maintained in Radburn, the lights being provided by the borough at a low municipal rate. In other matters, the Association is contracting with the City Housing Corporation to provide services, such as a private sewer system, which is maintained by the Engineering Department of the developing company.

The Trustees of the Association, to begin with, are officers of the Housing Corporation and public-spirited citizens of northern New Jersey, experienced in municipal problems, who are serving without compensation because of their interest in seeing this model community develop; but it is expected that, as the community grows, the administration will be turned over to representatives of the inhabitants or of associations of inhabitants and property owners. In the meantime the residents are assured of a disinterested, impartial and experienced management during the developmental years.

Restrictions That Are Clear, Definite and Flexible

This government gains its powers truly by the consent of the governed, for its rights arise solely out of contracts with them. A "Declaration of Restrictions" has been recorded with the County Clerk, and every purchaser in Radburn agrees to its terms by the acceptance of his deed.†

To be fair, the Housing Corporation has accepted the Restrictions for the apartment houses, stores, etc., developed and owned by it for rental. This Restriction Agreement confers upon The Radburn Association the powers discussed and creates a charge upon the property subjected which provides the revenue to maintain its activities.

The greatest defect in government-by-contract in the past has been that developers have written contracts which were not adapted to the needs of their communities as they grew. At Radburn the great effort has been to make the Restrictions clear and definite, but flexible. Thus the charge is to be fixed each year by The Radburn Association on the basis of its budget (adopted after a public hearing on notice to all affected) and the property valuations established by the municipal assessors. The only limit (necessary as a protection to purchasers) is that the charge shall not exceed one-half the municipal taxes.

The machinery of municipal government has likewise been adopted wherever possible. Thus, upon proposed changes in the Restrictions there are to be public hearings upon notice to persons affected (within an area determined by the Trustees), with a veto power by protest of the owners of 50 per cent of the area. The Association is organized on the city manager plan. To those interested in problems of administration, the career of government-by-contract at Radburn should be as interesting to watch as the operation of its novel street system.

†Copies of the Declaration of Restrictions and the Charter and By-Laws of The Radburn Association may be freely obtained by any one interested, from the City Housing Corporation, 18 East 48th Street, New York.

The Legislative Bodies of Large Cities

DATA RELATING TO CITY COUNCILS OR BOARDS OF ALDERMEN IN CITIES IN THE UNITED STATES HAVING A POPULATION OF OVER 300,000, SHOWING THE NUMBER OF COUNCILMEN OR ALDERMEN IN EACH CITY, THEIR TERMS OF OFFICE, AND MANNER OF ELECTION

Prepared by Frederick Rex, Librarian, Municipal Reference Library, Chicago, Ill.

City	Population Estimated as of July 1, 1928	Number of Councilmen	Term of Office (years)	Partisan or Non-partisan Election
New York City	6,017,500	71	2 (a)	Partisan
Chicago	3,157,400	50	2	Non-partisan
Philadelphia	2,064,200	22	4	Partisan
Detroit	1,378,900	9	2	Non-partisan
Los Angeles	1,250,000	15	2	Non-partisan
Cleveland	1,010,300	City manager govt., 25 including mayor	2	Non-partisan
St. Louis	848,100	29	4 (b)	Partisan
Baltimore	804	19	4	Partisan
Boston	799,200	22	2	Non-partisan
Pittsburgh	673,800	9	4	Partisan
San Francisco	585,300	18	4	Non-partisan
Buffalo	555,800	Commission govt., 5 including mayor	4	Non-partisan
Milwaukee	544,200	25	4	Non-partisan
Newark	473,600	Commission govt., 5 including mayor	4	Non-partisan
Minneapolis	455,900	26	4	Non-partisan
New Orleans	429,400	Commission govt., 5 including mayor	5	Partisan
Cincinnati	413,700	9	2	Non-partisan
Kansas City, Mo	391,000	9	4	Non-partisan
Seattle	383,200	9	3	Non-partisan
Indianapolis	382,100	9	4	Partisan
Louisville, Ky	329,400	12	2	Partisan
Rochester	328,200	9	4	Non-partisan
Jersey City	324,700	Commission govt., 5 including mayor	4	Non-partisan
Toledo	313,200	20	2	Non-partisan

(a) President of Board of Aldermen is elected for term of four years.
(b) There are 28 aldermen, one chosen from each ward, all elected at large. President is chosen and elected at large; 14 aldermen elected every 2 years.

Proposed Approaches to Hudson River Bridge

COMPREHENSIVE plan for the New York approaches and highway connections to the new Hudson River bridge between Fort Washington, N. Y., and Fort Lee, N. J., has been submitted to the Board of Estimate and Apportionment of New York City and to the Port of New York Authority. Arthur S. Tuttle, Consulting Engineer for the estimate board, and Othmar H. Ammann, Chief Engineer of Bridges for the port body, prepared the plan.

ONE OF THE TYPICAL APPROACH STRUCTURES TO BE BUILT

Its principal provisions call for approach ramps,plaza and street conections west of Fort Washington Avenue between West 178th and West 179th Streets; approach ramps, plaza and street connections west of tween Fort Washington Avenue and Broadway, between West 178th and West 179th Streets; provision for a future tunnel approach to the bridge between Broadway and Amsterdam Avenue and approach connections with Riverside Drive. Separate "on bound" and "off-bound" roadways are included for bridge traffic and all traffic intersections at grade are avoided. Roadway gradients are limited to six per cent and interference with existing streets has been prevented wherever possible.

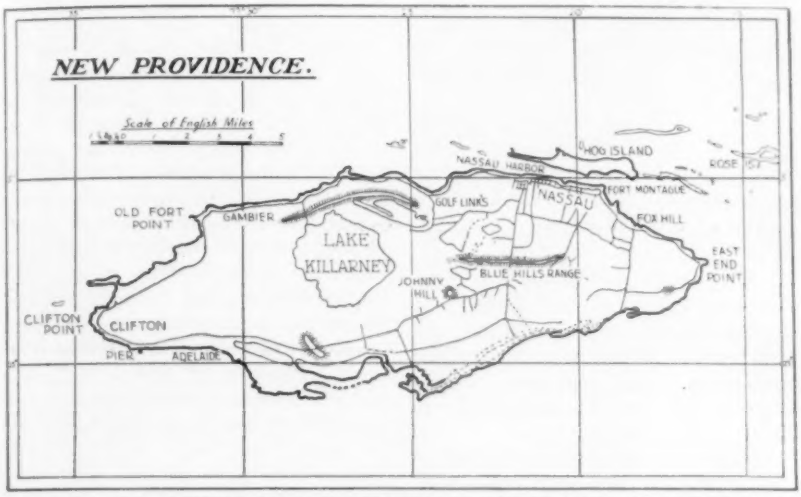
West 178th and West 179th Streets will be widened from 60 to 80 feet between Fort Washington Avenue and Broadway. When the annual bridge traffic reaches 10,000,000 vehicles, and revenues are available, the tunnel approach is to be built from the bridge under West 178th Street, to and across Amsterdam Avenue.

One ramp, running from the New York anchorage pier in Fort Washington Park, will be 145 feet wide, providing for two 30-foot side roadways with 6-foot sidewalks, and a central 60-foot roadway. Other ramp and approach roadways will vary in width from 20 to 35 feet.

VIEW OF PROPOSED BRIDGE APPROACHES ON NEW YORK SIDE, SHOWING CONNECTIONS WITH RIVERSIDE DRIVE

Developing the New Water-Works for Nassau, Bahama Islands

By A. L. B. PLUNKETT
ENGINEER OF WATER-SUPPLY, NASSAU, BAHAMAS, B. W. I.



MAP OF THE ISLAND OF NEW PROVIDENCE AND NASSAU, SHOWING THE LOCATION OF THE NEW WATER-WORKS

THE Bahamas consist of a chain of islands some 800 miles in length, which form the most northerly group of the West Indian Archipelago. These islands extend northwestward from within 75 miles of the island of Hayti to within 65 miles of the Florida coast. Nassau, the capital of the Bahamas, is situated on the island of New Providence, which lies about 180 miles due east of the southern extremity of the state of Florida.

The Bahamas Islands were discovered by Christopher Columbus in 1492, and San Salvador or Watlings Island is reputed to be the first place he landed on in the New World during his voyage of discovery. For many years after their discovery the Bahama Islands remained the property of Spain, but during the sixteenth, seventeenth and eighteenth centuries these Islands were alternately held by the Spaniards and English until the Spaniards were finally expelled in 1783.

The Islands consist of oolitic limestone, are low-lying and flat,—the greatest elevation rarely exceeding 100 to 200 feet,—and New Providence forms no exception to this rule. The greater portion of the surface of New Providence consists of oolitic rock, there being no soil to speak of, as it has risen above the level of the sea through the ages. The rock formation is extremely porous except at rare intervals, where a very tough, close-grain grey or red limestone resembling flint is found in shallow layers not exceeding 18 inches in thickness.

The annual rainfall of New Providence averages about 40 inches, as taken from records maintained over a period of 60 years. The maximum recorded was 91.5 inches in 1865 and the minimum 25.54 inches in 1882.

Natural Features of New Providence

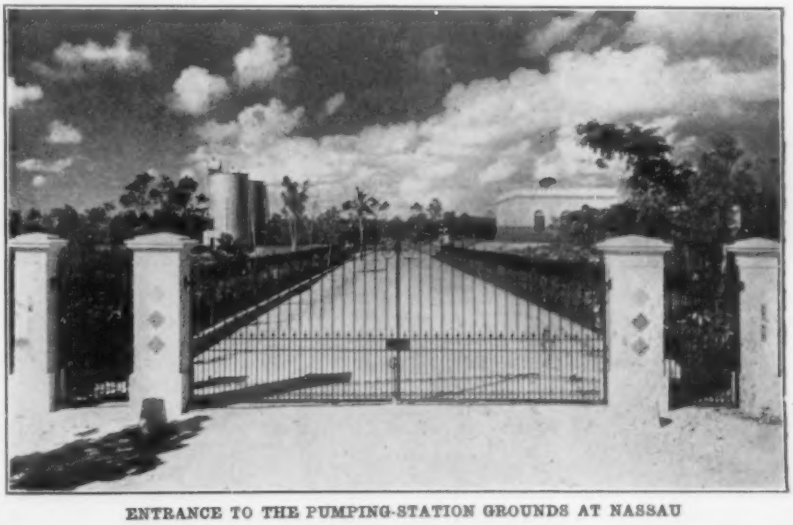
This island is about 21 miles long from east to west, and 7 miles wide from north to south. For the greater portion of its area it is flat, covered mostly with scrub jungle and in parts with pine of an inferior growth. There are lagoons on the east and south coast, four fairly extensive inland brackish water lakes, and several low-lying rocky hills running mostly east and west and nowhere exceeding 100 feet above sea-level. The most prominent of these hills is the ridge running along the north coast and the Blue Hill range, which divides the island in two.

Old Fresh-Water Supply Inadequate and Unsanitary

For some 300 years the obtaining of fresh water has occasioned much anxiety in Nassau. The only sources of supply have been the rainwater collected from the roofs of houses and stored in tanks, and the use of open wells. These have served the needs of the people for several generations, but have not always been found satisfactory, as in years of drought great hardships prevailed.

With the growth of Nassau from a small fishing and sponging village of a few hundred persons in the early part of the nineteenth century, to a winter resort noted for its serene climate, the need for modern sanitary conditions became imperative.

Typhoid fever in a mild form had been prevalent in Nassau for many years in a minor degree, but during the winter season of 1924-25 it assumed more alarming proportions, some of the visitors actually becoming victims to the fever. The Government then, on the very strong recommendations of the Chief Medical Officer, decided seriously



ENTRANCE TO THE PUMPING-STATION GROUNDS AT NASSAU

to consider a fresh-water supply scheme together with a modern drainage and sewerage scheme for the city of Nassau.

In 1914, at the request of the Government of the Bahamas, the Secretary of State for the Colonies sent out Howard Humphreys, to report on proposed water-supply and drainage and sewerage schemes for Nassau. Owing to the war, these reports were set aside until 1925, when Mr. Humphreys again visited Nassau, and after making further investigations with regard to the source of supply, he submitted a supplementary report which contained slight modifications on his 1914 report.

At the end of March, 1927, the author arrived in Nassau from England. He was appointed by the Secretary of State for the Colonies, as engineer for the preparation and carrying-out of the city of Nassau water-supply scheme.

Ground-Water Supply

The possibility of obtaining a good and ample fresh-water supply from wells was never credited by the oldest residents nor even by the majority of the more prominent citizens of Nassau. Generations of Nassauvians had found that wells fitted with power pumps were unreliable, as these invariably turned brackish or went dry.

No rivers or streams exist in the island of New Providence as, owing to the porousness of the formation, rain as soon as it falls penetrates into the strata, or runs off into the sea through underground crevices and fissures, or collects in natural depressions and overlies the salt water which permeates the island's strata.

The rock of New Providence is so porous that the entire formation of the island is saturated with salt or brackish water up to sea-level, except in localities where there are natural basins in which rainwater has collected under the ground surface and overlies the salt or brackish water.

A certain quantity of fresh water collected in a depression is constantly, though gradually, working its way out to the sea, as with the drop in tide there is a natural flow outwards where the water tends to find its low-tide level once more.

During years of excessive rainfall, such as in 1928, the depth of fresh water stored in a natural depression may reach as much as 30 feet. This was proved by actual borings.

Locating the Source of Supply

Howard Humphreys, as the result of his investigations in 1914 and 1925, selected a site for the source of Nassau's fresh-water supply on the southern slopes of the Blue Hill range, and due south of Nassau.

In April and May, 1927, the author had 4-inch diameter bore holes sunk over an extensive area in the proposed locality. After sinking these wells to varying depths into the fresh-water layer and carrying out pumping tests on each of the wells, he finally decided to locate 55 wells on the western side of the Blue Hill Road and 10 wells on the eastern side. In all, 145 acres of land was purchased and kept free from all possible pollution. No dwellings are to be permitted to be erected on the land, nor cattle allowed to be grazed on the area set aside for the source of the water-supply.

Laboratory tests were made on samples of rock taken from each of the borings for porosity. Ninety-eight per cent of the samples proved to be very loose grain rock containing as much as 25 to 30 per cent of voids.

From the above data and the findings of the average depth of the fresh-water layer in the area it is computed that over 480,000,000 U. S. gallons of fresh water is held in storage at this site.

THE MAIN PUMPING-STATION

Water Requirements of Nassau

The population of the city of Nassau is about 12,500. During the winter season, however, with the influx of visitors from the United States, the population is in the neighborhood of 15,000, and it is on this figure that the water consumption has been based, with every allowance for a possible increase in population up to 25,000.

After very careful investigations of the amount of water used by the different classes of persons, and taking into account the need for water for public purposes, such as watering streets, flushing of main sewers, fire-hydrants, and the supply of water to ships, the engineer decided to allow 24 U. S. gallons per day per person.

Source of Supply and Location

The new source of supply is located about 3½ miles due south of Nassau on the southern side of the Blue Hill range. The land chosen consists of a strip 3,300 feet long and 1,500 feet wide on the west side of the Blue Hill Road and 3,000 feet by 450 feet on the eastern side.

The Wells

There are 65 wells in all—55 in the western section and 10 in the eastern. In the western area the wells are arranged in five parallel lines running east and west, eleven wells to each row. The wells are placed 300 feet apart and are staggered. In the eastern section the wells are not so regularly arranged, but were located in accordance with the surface formation of the ground. Fifteen wells, these lying at the foot of the Blue Hill and varying from 25 to 40 feet in depth to fresh-water level, are fitted with motor-driven centrifugal pumps. The remaining 50 wells, which are sunk in low-lying, comparatively level ground, are shallow wells having in some cases a depth of only 3 feet to fresh-water level. These wells are operated by air-lift pumps supplied by the Indiana Air Pump Co., of Indianapolis, Ind., and have a working submergence varying from 40 to 50 per cent. The capacity of the pumps averages from 6 to 8 gallons per minute.

The centrifugal pumps were supplied by the Worthington Pump and Machinery Corporation, Harrison, N. J., and

are driven by 1-hp. General Electric motors. The pumps and motors, which are mounted on the same base plate, are placed in pits 6 feet square excavated out of the solid rock, and within 15 feet of fresh-water level. The pumps have 1-inch delivery, 1½-inch suction fitted with check and foot valves, and are capable of delivering 19 U. S. gallons per minute. The 1-h.p. motors operate on 3-ampere, 3-phase, 60-cycle current at 220 volts at a speed of 1,710 r.p.m.

Collection and Storage of Water from Wells

The water from each well is raised in a standpipe the height of which was fixed by calculation. The water from these standpipes empties into a funnel or pipe of larger diameter than the standpipe outlet and from these gravitates through collecting mains to an open reservoir centrally located.

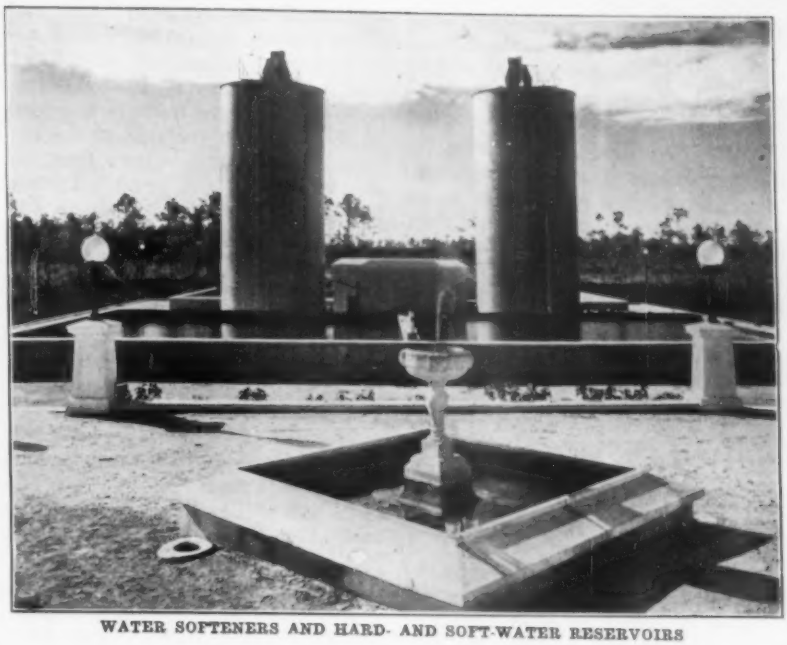
There are two open reservoirs each divided in half by a partition, in order to enable one section to be cleaned out at a time. Each section can hold 120,000 U. S. gallons.

Each reservoir is 80 x 40 x 10 feet. They are built of reinforced concrete and are sunk 6 feet 6 inches into the natural rock and project 3 feet 6 inches above ground level. There were three reasons for this: the main pumping-station's being located on slightly higher ground than these reservoirs increased the suction lift; the level of the fresh water was only 7 feet below ground level at low tide, and it was decided to avoid the expense of laying the concrete floor, etc., in the wet; by keeping the reservoirs 3 feet 6 inches out of the ground the sides serve as a barricade against persons falling into them and also keep the water free of leaves, sweepings, etc.

Water Softeners

Between the two open reservoirs are placed the water softeners. These were supplied by Bell Brothers, of Manchester, England. The process used is the lime soda process. It recommended itself for its simplicity and economy, lime being burnt on the property from excellent limestone. There are two softening tanks, each capable of softening 12,000 U. S. gallons of water per hour.

Hard water direct from the wells is received in reservoir A. From here it is raised by means of motor-driven centrifugal pumps located in pump-house No. 1 to the top of the softening tanks. The water, having been softened, gravitates into reservoir B from the tanks. The average hardness of the softened water is 230 parts per million.



WATER SOFTENERS AND HARD- AND SOFT-WATER RESERVOIRS

Chlorinating Plant

Between the softeners and the soft-water reservoir is placed the chlorinating plant, which supplies chlorine in gaseous form to the soft-water reservoir. The chlorinating plant consists of a duplicate unit supplied by the Paterson Engineering Co., London, England.

Main Pumping-Station and Compressor House

This building, which is located on raised ground to the north of the open receiving reservoirs, is built of reinforced concrete with pre-cast concrete blocks forming the fill between columns. The internal dimensions are 60 x 43 x 18 feet.

The building contains a duplicate compressor unit which supplies the compressed air for the working of the 55 wells operated by air-lift pumps, and a duplicate pumping unit which supplies water to the service reservoir located on the ridge overlooking Nassau.

The electrical equipment, transformers, etc., are placed outside in a separate building, which also contains a storeroom, lavatory and toilet for use of the pumping-station staff. The pumping-station grounds are fenced in by Bain's fencing, supplied by William Bain and Co., Ltd., Coatbridge, Scotland.

Compressor Plant

Two quadruplex single-stage compressors, supplied by Reavel and Co., Ipswich, England, comprise the compressor plant. Each compressor has a maximum piston displacement of 153 cubic feet per minute, and is fitted with a fast and loose pulley for auxiliary oil engine drive, or direct coupled electric motor drive. Each compressor is driven by a Metropolitan-Vickers ventilated 20-25-hp. induction motor. Two Ruston cold-starting 25-hp. single-cylinder oil engines are also installed as auxiliary power in case of motor failure.

Heavy-Duty Pumps

There are two 9 x 12-inch quadruple pumps, each capable of delivering 36,000 U. S. gallons per hour. These were shipped by J. Evans and Sons of Wolverhampton, England. Each pump can be driven by a Metropolitan-Vickers 60-hp. Ruston Hornsby oil engine, two of which have been installed and can be put into operation immediately if the electric current supply should fail.

Auxiliary Equipment

An automatic Nagretti and Zambra rain gage is used for recording rainfall in the area of the source of supply. The chart is changed daily. The chart records rainfall in half-inches.

An electric water-level recorder is located in the main pumping-station, and registers the level of the water in the service reservoir 3½ miles away. It records on a chart, as well as indicating on a clock dial, the variation in depth of water in the reservoir during the 24 hours. The recorder is electrically operated. It was supplied by the Lea Recording Co., Leicester, England.

Delivery Main

The water-main from the pumping-station to the service reservoir in Nassau consists of 8-inch diameter steel lap-welded screwed and coupled pipe. This type of piping was given preference over

cast iron bell-and-spigot pipe because of its cheapness and early delivery, and as skilled labor was scarce, screwed joints proved easy to make, especially as the ground traversed was mostly not flat.

The 8-inch main, after leaving the pumping-station ground, ascends the Blue Hills, where it runs through an old cutting and thence on into Nassau along the Blue Hill, Wullf Road, and along East Street, ascending once more to the service reservoir located in the Fort Fincastle grounds. The main is provided with two check-valves at the foot of the two ascents. Two air relief valves are fitted in the two peaks in the line and also gate valves to facilitate repairs or cleaning of the mains when required, without causing an undue loss of water.

Service Reservoir

The service reservoir is located in the Fort Fincastle grounds. The reservoir supplies the entire low-lying portion of the city, comprising about 75 per cent of the population. The service reservoir is so located that it gives a pressure in the service lines of 30 to 40 pounds per square inch.

At one time it was proposed to place the reservoir in Fort Fincastle, making the fort walls serve as the walls of the reservoir. This scheme was, however, abandoned, owing to strong local feeling against the possible structural alterations to an historic building. The reservoir was finally built underground to the west of Fort Fincastle. To help reduce unemployment, the excavation of the reservoir was done by manual labor, aided by small dynamite charges. When it was completed, the roof slab was covered over with earth, and grass planted, so that today no one would suspect the presence of a reservoir at this site.

To the west of the reservoir—also underground and adjacent to it—is the valve chamber, in which are the valves controlling the delivery main, the discharge main, the mains through which water is drawn from the service reservoir by the pumps supplying the high-level water-tower and the drain-off and wash-out pipes for the reservoir.

Sub-Pumping-Station

Originally it was proposed to place the pumping-plant for pumping water up to the water-tower in the valve chamber of the service reservoir, as at that time only one centrifugal motor-driven pump was to have been installed. In view of the possibility of future developments and also to avoid the possibility of a stoppage in the supply, the pumping-plant was duplicated, and this necessitated a separate building.

In selecting the site for the sub-pumping-station, public opinion had to be considered, in so far as the Fort Fincastle grounds were considered of historic interest. The sub-pumping-station was consequently placed to the south of the service reservoir and some 50 feet away on the side of the hill. From here, water is drawn from the service reservoir and pumped up into the tank in the high-level water-tower.

The building, as now located, is not easily seen, and the hillside site also proved an economic one, as the amount of necessary excavation was only 25 per cent of the amount which would have had to be done if the building had been placed entirely underground.

High-Level Water-Tower

This is located in the grounds of Fort Fincastle and about 150 feet to the east and a little south of the Fort, which was built about 1793.

The structure is of reinforced concrete. Special care was taken in fixing its general outline and proportions, as the engineer's desire was to design and erect a structure which, though graceful, would convey to the observer an impression of solidity as well as explain its utility.

The tank, which has a capacity of 102,000 U. S. gallons, is supported on four main buttresses and partially on a central shaft, which also serves as an electric lift shaft and contains a spiral staircase, running from the ground floor to the roof of the tank. The stairway is cantilevered and of reinforced concrete. On the roof of the tank is a chamber with a dome roof, consisting of reinforced concrete ribs and glass panes. On the outside and around this chamber, at a slightly higher level, there is a circular observation gallery.

"Stop Street" Signs Should Be Obeyed or Removed

To the Editor of THE AMERICAN CITY:

I have watched the development of the "boulevard stop" or "stop street" system from the very beginning and have no hesitancy in saying that, properly applied, it is one of the most effective traffic safety measures developed in the last two decades. Let me repeat, *if properly applied* —and that includes enforcement, of course.

Experience with this safety measure, however, has not been generally successful, due, aside from the lack of enforcement, to the designation either of the wrong streets or of too many stop streets. The claim that stop streets immediately become speedways is true, but such a statement is at once a confession that the street is not given proper supervision by a motorcycle officer. In fact, I have come to the conclusoin that most of the accidents today are the result of a very general lack of supervision and discipline.

Stop streets were first developed in Chicago, which was my home for many years. The essential factors for success are, first, the designation of only those streets with comparatively heavy traffic (not sufficient to warrant a continuous traffic-control system) of considerable length, with very few intersecting streets of anywhere nearly equal volume of traffic; and, second, supervision by patrolmen traffic officers at the heaviest intersections and of motorcycle or otherwise mounted policemen traveling up and down the street to see whether all vehicles come to a complete stop before entering or crossing the stop street. Simple, isn't it? If the stop streets are main arteries leading to the business district from suburban areas, or part of a transcontinental highway, so much the better. It is important, however, that parallel stop streets be not closer together than approximately one-half mile, and greater distance is desirable. Where stop streets are close together they become a nuisance to motorists on intersecting streets, who are obviously tempted to ignore the stop-street feature and thus add greatly to the accident hazard, besides interfering seriously with traffic. And where stop streets intersect, only the street with the larger volume of traffic should be "signed."

But what do we find in cities and states where the stop-street system has been attempted? Usually the stop streets designated are selected solely because of the large volume of traffic they carry. Often the volume is actually so great that the streets should be controlled by a traffic-light system. Almost invariably too many stop streets are designated, and all too frequently several such stop streets are within a few blocks of each other. It is not uncommon where stop streets intersect to see both streets "signed." And last but not least, seldom is any real effort made toward enforcement until stop streets become known as speedways and "death streets." Where stop-street signs are not obeyed by the majority of drivers, they would better be removed entirely. But for anyone to call the plan a failure, is a confession either of error in designation or of failure of law enforcement.

Drivers who have enjoyed the advantages of the stop-street system in Chicago are enthusiastic for the plan, and drivers where the stop streets were not carefully selected or where no enforcement has been attempted are equally enthusiastic in condemning it! It has been quite definitely proved, however, that with proper selection of the streets and reasonably good enforcement of the stop-street law, the stop-street plan is a real advantage to motorists, a safety feature generally, and a distinctly economical feature of a well-organized traffic-control plan. I understand that in several states the stop-street plan has been applied to the main arterial highways outside of cities with very general satisfaction, too.

FRED M. ROSSELAND,
Secretary-Manager, Newark, (N. J.) Safety Council.

New Headquarters and Gymnasium Occupied by St. Louis Police Department

By E. H. BARTELSMEYER

SECRETARY OF THE BOARD OF POLICE COMMISSIONERS, ST. LOUIS, MO.

ST. LOUIS has every reason to be proud of its newly constructed Police Headquarters and the Police Garage and Gymnasium Building, which are the last word in modern construction for police purposes.

These two attractive structures are located on the west side of Twelfth Boulevard, a thoroughfare 150 feet wide between Clark Avenue and Spruce Street, and are separated by an alley. Formally opened to the public early in January, they form a fitting background for the Plaza group of buildings now being constructed by the city.

The two structures were under construction for two years, the cost being distributed over three annual appropriations out of municipal revenues. The total construction cost of the Headquarters' building, including the cells and the architects fees, was $1,617,360, and the site involved an expenditure of $204,956. It cost the city $75,000 to acquire the site for the Gymnasium building, which cost, including the architect's fees, $539,799.

The headquarters' building is six stories in height over a basement partially below grade. Its site is 138 feet by 338 feet, and the building proper occupies the entire width and 218 feet in the other direction. The rest of this site is devoted to a granitoid parking area for automobiles. Three stories high, the garage and gymnasium structure fully occupies its site of 140 feet

Both buildings have a reinforced concrete skeleton enclosed in Bedford limestone walls backed with brick, concrete or hollow tile, as best suited to the purpose. A granite base surrounds them at the grade line. Steel casement windows have been used in the street fronts; hollow metal, double-hung windows in the rear and courts. The basement of the smaller building is large enough to accommodate the transformers for both structures.

The following somewhat detailed description of the two buildings is presented for the benefit of municipalities considering the erection of similar structures:

Police Headquarters Building

The main entrance lobby to this building is at 1200 Clark Avenue. The floor and structure and stairs leading thereto are clear-face Tennessee marble. The walls and columns are faced with Tavernelle Fleuri marble up to the underside of the plaster cornice. The slabs of wainscot vary in size, being approximately 18 by 42 inches, and are set in ashlar form. Glazed bronze and oak doorways open off this lobby into the various departments. With the exception of the first floor, where the use of Tennessee marble is continued, all public corridors have terrazzo floors and bases. The walls are wainscoted with Napoleon gray marble to the height of five feet. Above this point, all surfaces are plaster, finished with enamel paint. This treatment also applies to spaces provided for the waiting public, and to stairs. The lobby contains a memorial tablet erected to the officers of the department who lost their lives in the discharge of police duty from the year 1863 to the present date, numbering not quite 100. Vitreous china wall fountains are found in all the public corridors, serviced by an ice-water circulating pump.

The building is served by six elevators; two for the public, one for private use, two for freight and one for the prisoners. Board members and department chiefs use the private elevator, which also leads to a tunnel running under the Twelfth Boulevard sidewalk and alley to the Garage and Gymnasium building.The prisoners' elevator, besides leading directly to all cell rooms from the prisoners' receiving room on the first floor, is arranged to take prisoners to a future underground tunnel leading to the City Jail, located northwestwardly across Clark Avenue.

Immediately on entering the lobby the information bureau is observed at the right of the elevators, where a uniformed officer is on duty at all times. The automobile bureau, traffic division, traffic violation bureau, building superintendent, press, policewomen's division, as well as the central police district, are assigned offices on the first floor. The prisoners' entrance, booking counter of central district, and the prisoners' elevators are completely shut off from the public portion of the building. Patrol wagons bringing prisoners to headquarters enter through an enclosed driveway on Twelfth Boulevard that leads into the interior court. This entrance is at all times shielded by large grille gates which are opened and closed by means of an electrical operator under control of a watchman stationed in the lookout directly over the driveway. Detention rooms near the central district booking counter have been provided for temporarily holding prisoners pending disposition of their cases.

NEW POLICE HEADQUARTERS BUILDING ERECTED AT ST. LOUIS
This modern, six story structure has a frontage of 218 feet and cost approximately $1,620,000. The entire second floor is devoted to men's cells of the latest construction

Arrangement and Construction of Cells

The entire second floor is devoted to men's cells of the latest construction and painted a light green. They are well lighted and most sanitary. Isolation cells have been provided for those prisoners who require seclusion. Several detention rooms adjoining the turnkey's quarters have been assigned for the use of witnesses who are detained. Six conversa-

tion booths are under control of the turnkey, and can be used by attorneys or relatives desiring to converse with prisoners.

The cells in their entirety are of steel construction, with solid sections forming the sides, back and ceiling, and grilles for the fronts; the whole sitting upon and secured to a cement base six inches high. A niche at the back of each cell contains a combination basin and drinking fountain, a toilet, and a concealed light in a sloping ceiling. The floors of the niches are nine inches high, to give the proper drainage slope to the plumbing lines laid exposed on the floor in the utility corridors.

In the turnkey's corridor and in front of each cell is a lighting fixture secured to a continuous bracketed pipe. Each fixture has an adjustable feature so it can be made to throw its light rays directly in the cell, if so desired. The 36 cells in the men's cell room will accommodate 288 prisoners. The 24-foot ceiling height of this room will permit an upper tier of cells or double the expansion possibilities. The men's isolation cells will accommodate 42 prisoners.

The system of cell locks consists of three types; individual key type, which is operated by the jailer's key being inserted in the front face of the jamb; the individual dead-lock type, by the jailer's key being inserted in the side of the jamb; and a mass locking and unlocking device controlled by a lever.

All cell rooms have showers, with additional tub and laundry tray facilities for the women. The fixtures are recessed in deep niches, the walls and ceiling of which are faced with Vitro-Glass. There are no fronts in these niches. The floors are terrazzo. The valves of the showers are under lock and key and are accessible only to the jailor.

The masonry walls surrounding the various cell blocks have a steel dado 4 feet 6 inches above a cement base. Painted plaster surfaces form the finish of the balance of these rooms. The floors of the cells are cement, treated with a hardening compound and stained. All cell room windows are grilled.

Third and Fourth Floors

The assembly room for detectives, with adjoining locker and washrooms, and the Tracing Bureau are on the third floor. This room contains about 20 double desks and has plenty of light.

The fourth floor is assigned to the secret service division, consisting of the following offices: chief of detectives, assistant chief of detectives, etc.; gambling and liquor squads; forensic ballistics bureau; identification bureau, finger print room

VIEWS OF THE IMPRESSIVE POLICE GYMNASIUM AND GARAGE BUILDING

Fig. 1. How the new building in which St. Louis policemen exercise and drill appears from the street. Fig. 2. The gymnasium on the third floor. Fig. 3. Inspection of the officers of the metropolitan police department of that city in the gymnasium. All patrolmen and probationaries shown here have been appointed since June, 1925

and photographers' room; show-up room; matron's quarters for first offenders (female) and juveniles, and Bureau "F." The detention rooms for first offenders are comfortable, well lighted rooms with plaster walls and ceilings and terrazzo floors and base. The doors to these rooms are wire mesh. The windows are grilled.

Show-Up Room Features

The show-up room is adjacent to the prisoners' elevator lobby, from which there are also openings leading to the show-up platform and prisoners' detention room. The portion forming the assembly room is 37 feet by 55 feet, with a show-up platform eight feet wide by 41 feet long, paralleling one side. The proscenium of the platform is screened with a treated scrim material and bordered at top and bottom with colored lights. The border lights are made up of red, white and blue lights, alternating, the intensity and lighting effect being controlled from a dimmer-panel at one side of the proscenium. As a result, the victim can frequently identify a suspect when the same lighting effects are produced as were prevalent at the time the crime was committed. The windows in the assembly room have rolling wood shutters, which afford the desired darkness. The combination of these features makes vision through the screen from the platform side impossible.

Fifth Floor Facilities

The fifth floor contains the offices of the chief of police, his secretary, assistant chief of police, and clerks. The tel-a-type service connected with all police districts and several outlying suburban cities is transmitted from the office of the chief of police, as well as the daily broadcast of police information over Station WIL. The bureau of records is on this floor, where all reports from the various districts, divisions and bureaus are kept on file; also central district matron's quarters, where women prisoners are confined. The elevators from the central district office lead to the latter quarters. The 14 cells accommodate 112 prisoners and the 13 isolation cells, 26 women prisoners. Conversation booths under the supervision of the matron are also provided for the women's quarters. The total cell capacity, both men and women, is 468 prisoners.

Executive Offices of Board

The sixth floor contains the executive offices of the Board of Police Commissioners. Other offices on this floor include the secretary of the board, clerks, police relief and pension associations, superintendent of supplies, personnel officer, attorney for the board, inspector of police, chief surgeon and assistants, and the dispatcher. The latter has charge of the telephone system, as well as supervision of all departmental emergency equipment answering alarms and riot calls. An electrically controlled board is operated by the dispatcher, which at a glance informs him what patrol wagons and emergency cars are available in all districts.

The basement contains the assembly room for central district officers, printing department and property clerk, who has charge of all articles taken from prisoners, etc., and a large locker room for members of the department.

The offices, work, record, file, assembly, hospital and store rooms have cement floors on which rubber tile, linoleum or a cement hardening compound has been applied as best suited to the use of the room. The bases in the main are of terrazzo, with the exception of store-rooms in the basement, where a cement base skirts the walls. The walls and ceilings are plastered and painted.

Garage and Gymnasium Building

The garage on the first floor will accommodate 50 automobiles. Gasoline, air and washing facilities are all conveniently located. The floors are of granitoid and along the walls are raised curbs acting as bumpers. In the face of these curbs grilled openings occur which are connected to underground ducts leading to an exhaust fan provided for the removal of gases. The walls are of face brick with a three-foot dado directly over the curbs. The ceiling is plastered. There is a separate entrance and exit door which are mechanically operated by custodians from offices flanking each doorway.

The building houses the police training school, drillmaster and target range on the second floor. Here we again find cement floors and bases and plaster walls, with the exception of the pistol range, where a sound-deadening material covers all wall and ceiling areas. The shooting stalls and backstops are of steel. The ranges afford still and moving targets at 15 to 20 yards distance. The targets are suspended on steel trolleys and can be placed at the desired ranged by means of a mechinacal operator from the shooting stall. The range is equipped for special lighting effects.

The gymnasium on the third floor has face brick walls up to the underside of the running track, the balance being plastered like the ceiling. The floor is of maple, laid on sleepers. The floor of the running track is covered with cork linoleum. It is furnished with all regulation athletic equipment. There is a 12-foot ramp leading from the gymnasium on the third floor to a doorway onto the street, the principal purpose of which is to permit the police force to march from the building in military formation.

There is a tunnel leading from the headquarters' Building basement to the Garage and Gymnasium Building. Within the moment after an alarm is received necessitating prompt police action, several officers pass through this tunnel into the garage, where the "flyer" is being warmed up by a chauffeur for instant departure.

Heating and Ventilating Systems

The sub-basement contains boilers for the heating of the buildings. Three boilers are provided, two of which will take care of the peak loads of both buildings, the third being a stand-by as an emergency or relief boiler. The ventilating system is confined to corridors, interior and cell rooms. The air is washed, then passed through oil filters and ozonated.

Electric Wiring System

Both buildings are being serviced by a a local light and power company through transformers, the whole being so arranged that power at any time can be obtained from the municipal power plant. The system consists of illuminating, floor and fan outlets, push-buttons and bells, riot gongs, dictaphones, hospital calls, paging system, bank alarm, clock and time stamp systems, electric typewriting machines, signal boards, telephone system and battery rooms.

A master clock located in the central district quarters controls the clocks in all parts of the building. Bank and other alarms run into the central district on a special panel, which indicates the point where the alarm is from by an electric light as well as by a riot gong. This panel is also duplicated in the office of the dispatcher.

Ceiling fixtures provide the general working light, through three gang floor boxes, suitably located, and afford possible individual desk lights, together with telephone and other low-tension connections.

The telephone service consists of a Bell telephone automatic switchboard with a dial intercommunicating feature and the regulation manual fire and police telephone system. A pent house on the top of the Headquarters' Building contains the elevator controls.

A room, together with the conduits for future wires and anchors in the roof construction for aerial towers, has been provided for a broadcasting station should it be found advisable to install such equipment.

Compulsory Life-Saving Course for St. Petersburg Police

ON April 15 every member of the Police Department and the Detective Bureau of St. Petersburg, Fla., was notified by Chief of Police B. B. Chesney, that he would be required to take the regular American Red Cross Life-Saving and First Aid Course, as a part of his scheduled duties.

Drills under the schedule proposed will be given squads from the Police Department in rotation every evening from 7:45 to 9:00 p. m. in the Spa municipal pool. The classes will be in charge of Captain H. H. Noel, Patrolman A. J. Riggs, and Tod Tucker. Edward H. McCrahon, manager of the municipally owned pool, believes that St. Petersburg is the only city making swimming, life-saving and first aid compulsory in its Police Department and he adds that "as the Sunshine City is seven-eighths surrounded by water, every policeman a swimmer will be a mighty good thing. The city of St. Petersburg has an American Red Cross life-guard unit consisting of fifteen qualified young men, and its able captain, Willis Yeamans, is a swimmer of note throughout the state of Florida."

A City Block— How Long? How Wide?

To the Editor of THE AMERICAN CITY:

In reading over Lt.-Col. Bell's article in your May number, as well as the comments by Messrs. Black and Crane, I am led to add some qualifying observations. For instance, "Why should a block be as long as possible?" This suggests delving into the economics of subdivision planning. In the first place, the street somewhat resembles an iceberg—more cost is buried under the ground than on the surface, so that merely making the pavements narrow is of limited importance in the total cost. In one large subdivision the costs of completely improved streets and utilities is given, from actual experience, as follows (including land cost at $2,000 per acre):

TABLE A*

COMPLETE COSTS OF IMPROVED FRONTAGE

	Per Foot
Land in lots 125 feet deep	$6.25
Land in streets 50 feet wide	1.33
Complete surface improvements, paving, curbing, walks, trees	9.24
Complete underground work, water, gas, sanitary and storm sewer and electric conduits	13.33

The most important source of economies is in having the perimeter of the block as great as possible, so that the usable frontage is large in proportion to the non-usable or side street frontage. In every block, say with the cost of lots 125 feet deep, there is 250 feet of side street as well as intersections to be absorbed by the net used frontage. Not all utilities are needed in side streets if they are not used for frontage, but taking land at 10c per square foot, streets 60 feet wide, frontage streets at $30 per linear feet (complete for full width including gas and water,) side streets at $24 per foot, we have the following astonishing difference in cost for blocks of different lengths:

TABLE B*

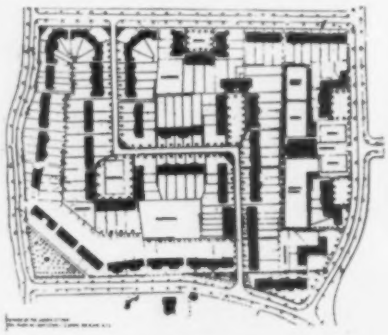
COMPARATIVE COSTS FOR SHORT AND LONG BLOCKS

Block Length	50-Foot Lot	Per Foot
250 feet net	$2,741	$54.82
500 feet net	2,086	40.17
1,000 feet net	1,806	36.12

		Each	Per Ft.
		$2,741	$54.82
Block 1:	250 x 250 ft.; 10 lots @ $1,525, plus streets and intersections ÷ 10	$2,741	$54.82
Block 2:	500 x 250 ft.; 20 lots @ $1,525, plus streets and intersections ÷ 20	2,086	40.17
Block 3:	1,000 x 250 ft.; 40 lots @ $1,525, plus streets and intersections ÷ 40	1,806	36.12

Thus we have nearly $1,000 difference in actual cost between a 50-foot lot in a 250-foot and 1,000-foot block. Yet whole cities are laid out with blocks 300 to 400 feet long. Therefore, we must make blocks as long as possible; 1,300 feet is not too great, especially if there is one cross walk through the block for pedestrian convenience. In some whole communities in this country blocks are so short that side streets and intersections, run over 100 per cent in addition to net frontage; common practice ranges from 50 per cent to 70 per cent—unusually good practice 30 per cent to 40 per cent. English garden cities are as low as 18 per cent to 25 per cent. This last is obtained by using the block all around with a shallow building set back and shorter radial lots at the corners very much as suggested by Mr. Crane (page 141, May). Houses are placed rather close together and planned with outlook upon deep gardens and interior block play spaces. Where these latter get too large, some of the space is recaptured by use of groups of houses on narrow, inexpensive lanes, but these require extra underground utilities which reduce the saving. On the whole, however, such practices are well worth the attention of suburban towns where these very considerable economies in non-usable streets and utilities should be a welcome relief.

*In Table A the cost per salable foot without land is $32.77. The blocks are about 250 x 625, so that for each 625 feet of front streets there is 300 feet of side street and intersection, or 48 per cent. If, as in Table B, we take one foot of frontage street at one-half of $30, or $15, plus .48 foot of side street at one-half of $24 a foot, or $5.56, we have a total of $20.56. The $2.25 difference is approximately the cost of electric conduits not considered in B.



SITE PLANNING AT LETCHWORTH GARDEN CITY, ENGLAND
Inexpensive roads, gardens, playgrounds, pleasant surrounding

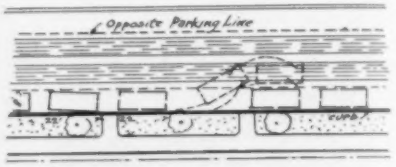
Radburn has gone perhaps further than other communities in this country to the use of large major blocks of 30 to 40 acres with closed-end lanes for house groups. In addition to economies, the effort has also been to secure quiet and safety and proximity to internal parks and play spaces for every family.

Street Widths as Related to Methods of Parking

In the matter of street widths, it may be in order to suggest some fresh principles for consideration. Paving widths should certainly be graded according to the kind of traffic intended, as suggested in Mr. Black's comments. But should we not begin to think of marking all traffic lanes and requiring observance except in emergency? Many streets with ample space for moving traffic have their efficiency ruined by habits of motorists in parking. Curb parking is crude and requires wasteful pavement area. Diagonal parking is now unsatisfactory because backing out is dangerous and ties up two lanes of moving traffic. Other countries have found that diagonal parking facing in the direction of traffic is safer and interrupts traffic in only one lane and for a shorter time (see the rather theoretical sketches herewith). It would be worth trying anyway, and while we are about it, why not use different kinds of pavement, or different colors, for marking traffic ways and parking space and then require traffic ways to be kept open. For example, white pavement might be used exclusively for traffic, including bus stops and turning spaces in long blocks. Dark pavement for parking. Now you will frequently find a half-dozen vehicles parked in a block just so that there is no clear place left where one can turn without backing. These are, of course, merely suggestions looking toward the time when we may no longer afford to add pavement in proportion to the number of new licensed vehicles and must turn to better regulation of both moving and parked vehicles.

HENRY WRIGHT.

New York, May 9, 1929.



PARKING PARALLEL TO CURB
Difficult to regulate. Interrupts one lane of moving traffic

FORWARD DIAGONAL PARKING
Driver at 1, 2 and 3 in bad position to observe approaching traffic. Interrupts two lanes of traffic

REARWARD DIAGONAL PARKING
Driver in good position to observe approaching traffic. Interrupts one lane of traffic, for shortest time

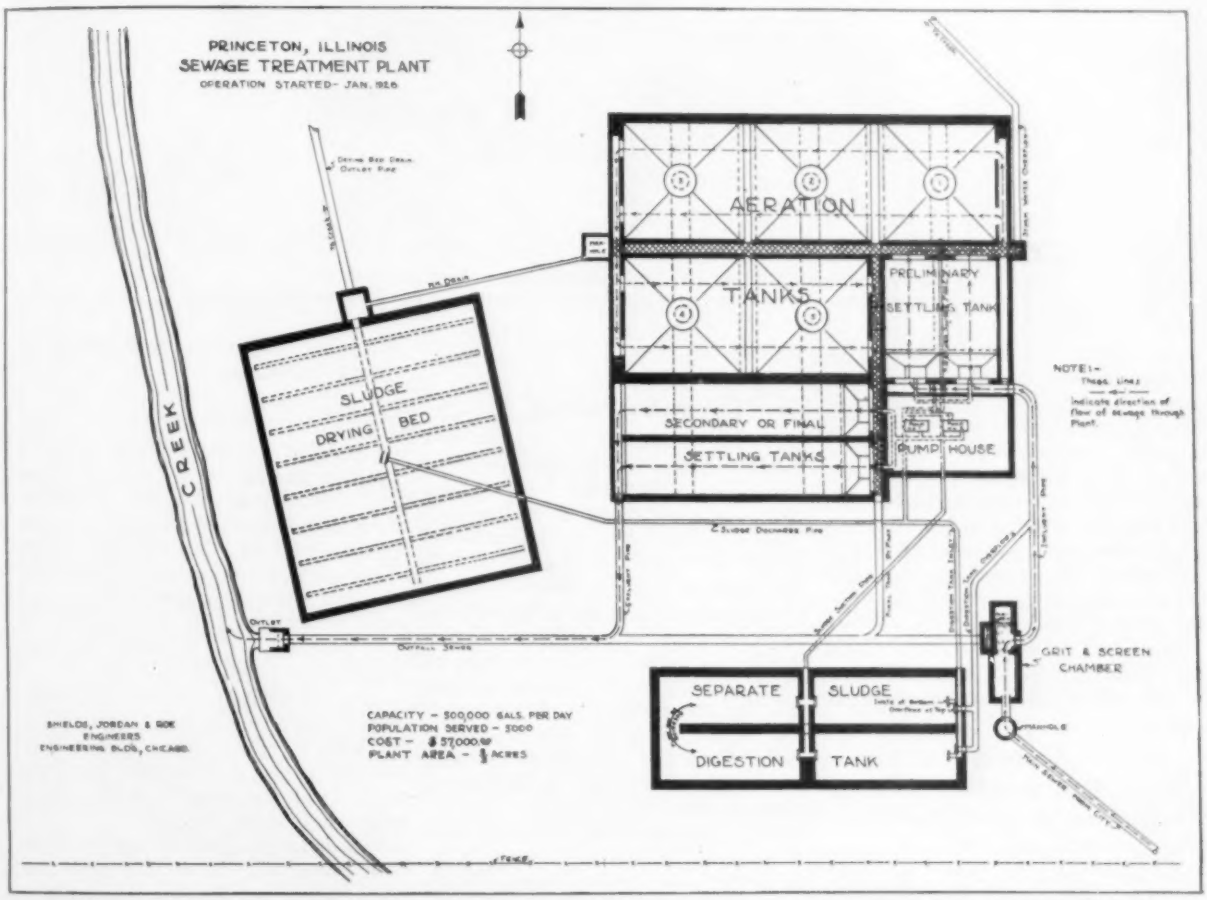
The article by Lt.-Col. J. Franklin Bell, former Engineer-Commissioner of the District of Columbia, referred to above, together with comments thereon by Russell V. Black, of the Philadelphia Regional Planning Federation, and Jacob L. Crane, Jr., engineer and town planner, Chicago, appeared at pages 139 *to* 141 *of* THE AMERICAN CITY *for May. Other comments on the matters discussed will be welcomed by the Editor.*

Mechanical Surface Aeration for Sewage Treatment

By FRANK C. ROE

SHIELDS, JORDAN & ROE, ENGINEERS, CHICAGO

THE sewage treatment plant at Princeton, Ill., consists of a grit and screen chamber, a preliminary settling tank, five aeration tanks employing Simplex surface aerators, two final settling tanks, a sludge digestion tank, and a sludge drying bed. The Simplex mechanical aerator, which is the novel part of this installation, was first installed in the United States in an experimental unit at the Des Plaines River sewage treatment works of the Sanitary District of Chicago and later at Argo, Ill., Decatur, Ill., and Houston, Texas, on trade wastes.



GENERAL PLAN OF THE PRINCETON, ILL., SEWAGE-TREATMENT PLANT, SHOWING DIRECTION OF FLOW OF SEWAGE THROUGH THE PLANT

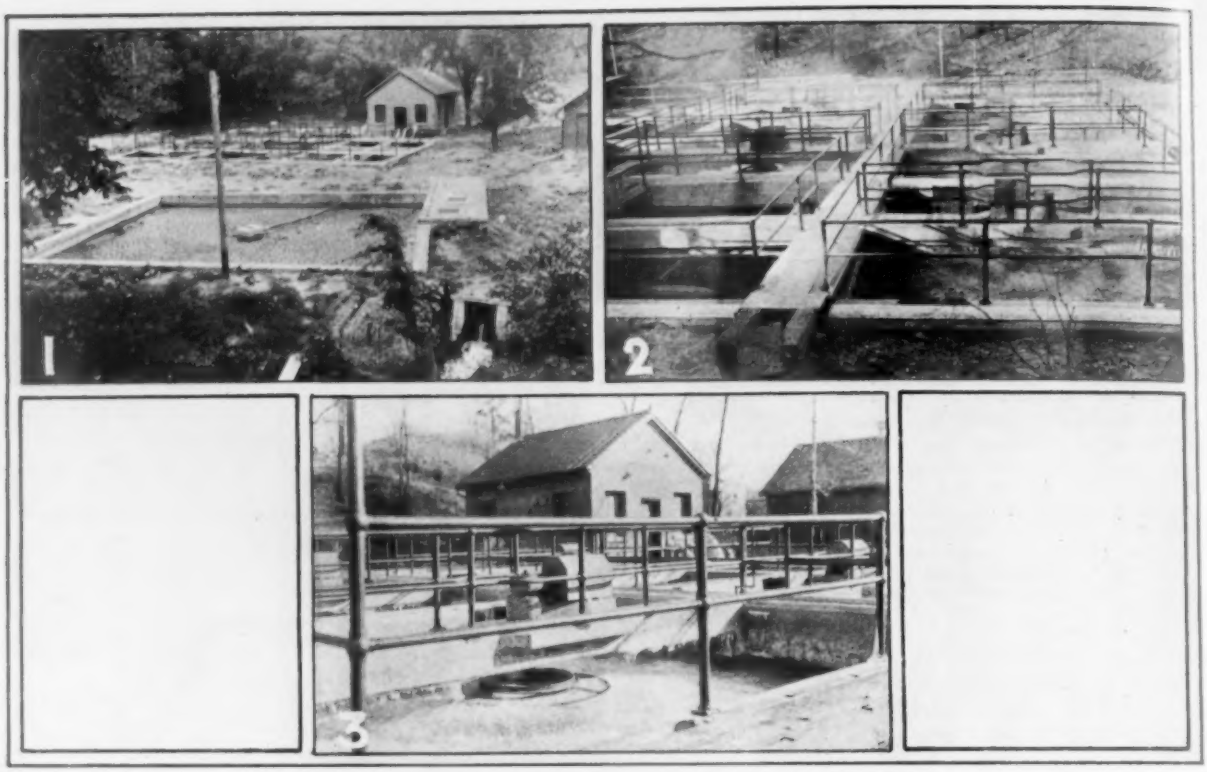
Surface Aeration

The Simplex system produces an activated sludge by bringing the sewage in contact with the air at the surface instead of bringing air in contact with the sewage below the surface, as in the case of the more widely used air-diffusion process. A circulatory course is obtained which accomplishes what spiral flow does in some air-diffusion installations, and a flocculent sludge is developed after an aeration period of from four to ten hours, depending upon the strength of the sewage. Earlier installations were driven by a line shaft with a motor at some protected central point which enabled one motor to drive five or six units. Princeton installation, however, has an individual motor and drive for each unit, which increases the flexibility of the plant as a whole.

Conditions at Princeton

Princeton is the county-seat of Bureau County in the north central part of Illinois. It is a farming community with about 5,000 population and there are no industries or special features, affecting the quality of the sewage. Ground water infiltration increases the average flow from 300 to about 500 gallons per minute, beginning approximately 12 hours after a rainfall of ½-inch per hour or greater and lasting at least 48 hours after the storm has ceased. The city had been served for 26 years by a settling tank and contact filter bed. The plant was not cared for, was greatly overloaded, and had become obsolete. The total septic tank capacity of 6,400 cubic feet was designed to give a retention period of three hours to the sewage, but observations showed about twenty minutes retention.

The filter-bed had an area of 1,920 square feet, or 0.044 acres, and was expected to operate at a rate of 2 million



THE PRINCETON, ILL., ACTIVATED SLUDGE SEWAGE-TREATMENT PLANT
1. A view of the entire plant. 2. The aerating tanks. 3. A close-up of one of the surface aerators

gallons per acre per day. This bed had become clogged in recent years since the rate of filtration would have had to be over 11 million gallons per acre per day in order to operate. As a result, the effluent from the septic tank ran over the side walls of the bed and eventually into the creek. On account of the conditions mentioned, the creek into which the effluent discharged became badly polluted and damage suits totaling $20,000 were brought against the city by riparian owners downstream. Action was withheld pending the construction by the city of an adequate treatment plant.

New Plant

The new plant is designed to care for 500,000 gallons daily and consists of a grit and coarse screen chamber and preliminary settling tank with a one-hour detention period, five aerating units with eight-hour detention period during the sixteen-hour maximum flow, a final settling tank, having a detention period of two hours, and a pump-house. All tanks are uncovered and are of reinforced concrete construction, treated with two coats of a bituminous waterproofing. The pump-house is of brick construction and contains two double-acting plunger pumps for pumping sludge, a wash-water pump, a sludge division box, and electrical control equipment. The old septic tank was converted into a separate sludge digestion tank, and the old filter into a sludge drying bed.

Sludge Handling

Sludge is collected in flat-bottomed preliminary tanks by two flights of Link-Belt sludge collectors and pumped from the hoppers directly to the sludge digestion tanks. The settled activated sludge in the final tank is likewise collected by two flights of Link-Belt sludge collectors and is pumped from the hoppers to the division box in the pump-house. A portion of the sludge is separated here to flow by gravity to the first aeration unit. The remainder flows to the digestion tank, where it is mixed with the fresher solids from the preliminary settling tanks. The percentage of sludge returned to the influent is regulated by a movable partition on the face of the weir in the sludge division box.

Flexibility of Operation

A feature of this plant is its flexibility of operation. Either preliminary or final settling tanks may be by-passed in case of a breakdown. The first or last aerating tanks may be used for settling purposes, since there is a suction pipe connected to the pumps from the bottom of each tank. Any of the aerating tanks may also be cut out. A temporary overflow weir is provided to care for the excess ground-water infiltration during a storm. The city expects to reconstruct and add to its storm-water system, which will relieve the territory now causing excessive infiltration.

Operation

Operation of this plant began January 20, 1928, and has been continuous since that time with the exception of two or three interruptions of a few hours when the power was off. Notwithstanding the fact that zero weather was encountered during the first few weeks, the sludge built up rapidly and a stable effluent was produced. No troubles were encountered as a result of the formation of ice on the aerators or tank structures. Any ice forming was removed daily for the sake of appearance. The warmer months of the year brought improved results and conditions favorable to a better study of the plant.

Measurements of the sewage flow have been taken four times daily since the plant started, and the wide range of flow recorded indicates the most serious difficulties to be met in the operation of the plant. During the early spring, flows were recorded as high as 1.5 million gallons daily after rains, and the average flow up to May 1 was about 700,000 gallons per day. The plant was designed for a capacity of 500,000 gallons per day, and it is apparent that such an overload could not be carried continuously. Consequently, an overflow weir between the preliminary settling tank and the aeration tanks was set to allow all sewage over 500,000 gallons per day to be discharged

directly to the creek. This excess sewage, however, has the benefit of effective tank treatment. Since May 1, practically the entire flow has been treated except during a few periods of heavy rains, particularly in July, 1928. The average flow since May 1 has been about 600,000 gallons per day, the minimum being 308,000 gallons per day.

Results

The preliminary settling tank has given very satisfactory results, although the sludge-collecting equipment was hard to start during cold weather because of the high viscosity of the oil in the planetary reduction gear case. This tank has been removing an average of 43 per cent of the total solids.

The aeration units have also been very satisfactory in building up and maintaining a typical activated sludge. The aerators have been raised ½-inch since operation began, with an appreciable power saving as a result and without an apparent falling-off of analytical results.

The final settling tanks have not given any better results than the average run of activated sludge settling tanks in other cities. Some colloidal matter and finely divided floc have been noticed flowing over the final effluent weir, but evidently these light solids have little or no oxygen demand. The entire return run of the flight or scrapers of the Link-Belt collecting equipment in these final tanks is raised to just below the flow line instead of returning from the top at the inlet end of the tanks to the bottom at the effluent end, as has been customary practice. This change brought about the apparent reduction of a current at the bottom of the tanks and a slight reduction of the floc going over the effluent weir.

Since the digestion tank is an adaptation of an old septic tank to another use, it was expected that good results might be hard to obtain, but six doses of well-digested and odorless sludge have been withdrawn and applied to the drying beds and they have been reduced to typical well-dried and stable sludge. The digestion was not seeded with ripe sludge nor has any lime been added to the sludge at any time to control the pH. Odors are not perceptible near this tank, because of an old brick building which covers it, and the odors inside the building are not offensive. There is not much scum on the surface of the liquid, and what has gathered does not prevent gas from escaping freely, a fact which is probably due to agitation and hosing of the scum thoroughly once or twice a week.

Power Demand

The power used for the aerators alone previously to their being raised averaged 174 kilowatt-hours per day. Since raising, the average has been 144 kilowatt-hours per day. The power requirement varies with the rate of sewage flow, since there is no way to automatically raise the aerators as the quantity of sewage per day increases and to lower them as the quantity decreases, nor is it practical to vary their speed. Assuming that the quantity of sewage being handled is equal to the capacity of the plant, or 500,000 gallons per day, the power requirement now is at the rate of 17.5 horsepower per million gallons daily.

Previous to lowering the aerators and with the plant operating at capacity, the requirement was 19.6 horsepower per million gallons daily. The total average consumption at present for aerators, pumps and collecting apparatus is 220 kilowatt-hours per day.

The bar screen is cleaned four times each day, the screenings from this operation averaging one-half cubic foot per day.

The preliminary tank sludge removed has varied considerably in volume, on account of varying periods of pumping, but has averaged 2,250 gallons per day.

Subgrades and Bases for Richmond, Va., Pavements

By R. KEITH COMPTON
DIRECTOR OF PUBLIC WORKS, RICHMOND, VA.

THE useful life of any pavement depends primarily on the supporting power of the subgrade and the ability of the base to distribute the load over a sufficient area, which comes to it through the improved surface over the base. These two factors are more or less dependent upon a third, namely, inspection—not only of material and construction method but also the preparation of the subgrade.

Preparation of Subgrade

The question of the preparation of the subgrade in the city is entirely different from that in highway work. In most cases where a street is to be permanently improved it is of course necessary for the utilities to install their underground work, which means that the subgrade will be severely cut many times just ahead of the paving. This weakens the subgrade, and our first concern is to put the subgrade back in condition that will hold the base.

In Richmond all ditches are required to be either tamped or puddled; generally the sewer ditches are puddled, on account of being extremely deep; and with gas, water and conduit ditches tamping is resorted to.

After this has been done and the rough excavation started, we require a 10- to 13-ton three-wheel roller to go over the subgrade and find the ditches. The inspector notes the location of the ditches which are shown by the rolling, has them refilled and rerolled, if possible, until there is no evidence of further compression.

In the event that these ditches are soft or for other reasons cannot be sufficiently compacted, the inspector makes a note of them and when the base is poured they are reinforced.

Inspection

I cannot stress too strongly the necessity for proper inspection of all parts of the work. No doubt money is being wasted in some instances for richer mixes and extra thicknesses of base on account of not being properly inspected.

My experience has been that approximately a 1:3:6 mix or .175 barrels of cement per square yard for a 6-inch base, where there is proper inspection, will give 300 pounds per square inch at extreme fiber in ten days, which we require as the strength to be attained before the base is allowed to be hauled upon for the unloading of brick or other material. A tensile strength of 300 pounds per square inch is approximately 1,350 pounds compression.

Inspectors

Inspectors should be only those men who are familiar with the work and not men picked at random or given a job for political reasons.

An inspector should be directly under the jurisdiction of the construction engineer, who in turn should be solely responsible for the class of work constructed.

Our method of handling paving work is to have an inspector on each particu-

lar division of the work; namely, one who goes through with the preparation of the subgrade, which of course includes the grading. Another one follows with the construction of the base, and still another who is in charge of the laying of the brick.

Construction of Base

In the construction of the base we first specify that all concrete work is to be done with a batch plant for the measurement of materials, and a boom and bucket for the placing of the concrete.

To insure the proper thickness of base we accurately establish the grade of the top of the base at the quarter and center points. The final checking is done after the mixer moves ahead after pouring a length of boom. If there are any depressions made by the mixer on the subgrade, these are rammed and brought to a finished surface. If there are any high places, we require that these be cut down to the proper grade. This work is given close inspection in order that our full depth of base may be assured.

The pavers are required to be equipped with batch meters set for 1¼ to 1½ minutes and water-measuring tanks specified. This, I believe, with a batching plant insures good concrete, and in fact our tests on beams have proved that these refinements are advantageous. After the pouring it is required that this concrete be tamped with what is locally known as "white eye." This is an oak beam about 12 feet long with handles at each end. This tamp is worked by two men lifting each end alternately and working at right angles across the roadway, with its length parallel to the center line; it gives a compression equal to approximately a 6 by 6-inch cast iron tamp, and helps to eliminate short bumps, as is the case in the base when the tamps are used.

The tamping of course is followed by the use of long-handled floats, which bring the base to a uniform crown.

Curing

The curing of the base is done by sprinkling for ten days; one man and adequate hose are required for every 1,000 square yards of base. As we believe that the curing of the base is one of the most necessary parts of the work, we also give this close inspection to be sure that this part of the specifications is carried out.

Laboratory Control of Mixes

It is my opinion that for the proper laboratory control of mixes for bases it is essential for the municipality to operate its own laboratory. If this is done, it is a very easy matter to get beams when and where they are necessary for checking the mix. We require that these beams be taken often enough to insure that the mix is of the proper proportions and that the required strength is obtained.

We have for years found it to be to the advantage of the city to furnish the cement. Although we specify in our base work a 1:3:6 mix, if it is necessary for some reason or other to vary these mixes, our furnishing this cement allows us this latitude without any discussion with the contractor.

ACKNOWLEDGMENT.—A portion of the discussion of a paper on lean vs. rich mix concrete foundations for brick pavements at the Twenty-Third Annual Meeting of the National Paving Brick Manufacturers Association.

Growth of Water-Works Under Municipal Ownership in Beaver City, Utah

By JOSEPH A. MANZIONE
CITY MANAGER, BEAVER CITY

ON September 1, 1911, Beaver City, Utah, granted a franchise to two individuals to install a water system in the city. Under the name of the Beaver City Water Service Co., these men installed three miles of 5-inch wood pipe from a series of springs in Bakers Canyon, to a reservoir just outside the city limits. From this reservoir to the lower part of the town, a 6-inch wood pipe line was installed for a distance of about 2½ miles, and laterals were run north and sound from this main.

City Purchases System

In 1914 Beaver City saw the need of owning this system and took steps to purchase it. On August 27, 1914, a committee of taxpayers met and the sale was negotiated, so that the water system passed into the hands of the city. Everything went along very nicely while the system was new and in good condition, but, as it grew older, the wood pipe line rotted, until in January, 1925, the line was leaking so badly as to impair its value, and roots were growing right through the pipe and shutting off the water-supply.

Wood Pipe Replaced

In January, 1925, the city borrowed money from one of the local banks to replace 1½ miles of this wood line with 8-inch Armco 14-gage ingot iron slip joint pipe. This pipe was purchased because its cost was within the reach of the city, which was bonded heavily, and its installation gave a long stretch of pipe through the canyon where the trouble with roots was the worst.

In 1926, the city appointed a City Manager to look after the business interests of the city. In December, 1927, when the Mayor and City Manager made out the budget for 1928, it was found that the city had about $6,000 available which could be expended for a new main water line, so that the old wood line could be entirely replaced. At the November election a change in administration took place and another City Manager was appointed. About the first week in August, it was decided that the condition of the old line constituted an emergency. It was decided to immediately install the pipe and after some discussion regarding Armco and cast iron, it was determined to purchase 3½ miles of the former, which could be secured cheaper than 2 miles of cast iron pipe. Because of limited available finances, the Armco pipe was purchased, as the experience with this pipe in the canyon for four years had shown that it could be used successfully without danger of leakage.

Improvements at Power Plant

In May of that year a new generator was installed in the municipal light and power plant and a 20-inch pipe line was replaced with 28-inch 10-gage steel pipe for high-pressure service to supply water from the canal to the water-wheel, a distance of 1,468 feet. The pipe which was removed had been placed in the ground at a depth of one foot in October, 1904, so that when removed it was 24 years old, and it was still found in serviceable condition and was sold for $1 a foot.

Further Water-Main Extensions

An order was placed with the Burnham Manufacturing Co., Woods Cross, Utah, for two miles of 8-inch 14-gage gilsonite dipped steel pipe. As soon as notice was received that the first carload was on its way, trenching was

BEFORE, DURING AND AFTER THE INSTALLATION OF THE NEW WATER-SUPPLY MAIN AT BEAVER, UTAH

1. A daily occurrence on the old wood pipe line. 2. The 28-inch pipe being lowered into the trench at the pumping station. 3. Welding the last section of the new pipe line

started at the reservoir, working toward the center of town, as this section was in greater need of replacement than the stretch above the reservoir. Considerable difficulty in securing labor was experienced, for most of the workmen of the town were in the mountains doing assessment work, and also several miles south of Beaver City the State Road Commission had begun work on a highway.

Following this, on the 20th of October, the open season for deer began and there was a rush of hunters away from town. In spite of all this, the work was finished about the middle of November and the water turned into the mains. This new line proved a blessing, as for the first time, adequate pressure was available throughout the town.

Replacement has continued with the installation of 1½ miles of new pipe from the mouth of the canyon to the reservoir. In December, 1928, the welders completed the last joint of pipe, and Beaver City is now fully equipped with Armco pipe throughout its system. The leaks have been stopped, and the streets and roads are no more dotted with tree trunks placed in holes to mark the places where the main had to be dug up.

In the budget made up at the close of 1928, the sum of $11,000 was set aside to apply on the payment of the pipe which has just been installed. When the 1930 budget is made out, it is expected that the remaining $3,000 due will be paid off.

Detroit Subway Plan Rejected at Referendum Election

A PLAN for providing a rapid-transit system for the city of Detroit, Mich., was defeated in a special election held recently, by nearly a three- to-one vote of those participating in the referendum—less than one-third of the number registered. The plan proposed is the fruit of several years' engineering and financial study; it was sponsored by both the Rapid Transit Commission and the Street Railway Commission, and had considerable backing. Like the city's surface transportation system, and in accordance with precedents elsewhere, the rapid-transit scheme was to be under municipal ownership. A bond issue of $54,500,000, or 60 per cent of the estimated ultimate cost of subways for the central area, was proposed. These were to consist for the present of an east-and-west line with two short sections of future through lines north and northwest, the latter two lines to be used at present to take the street cars off the surface in the congested section. These lines are part of a comprehensive general scheme for gradual future development. A city-planning program going back many years provides for a number of traffic arteries over 200 feet wide in the outer area with a central strip for rapid transit.

The *Engineering News-Record* states that Mayor Lodge has called for the submission of a new plan and that the Transit Commission does not look for any material change in the financial details of the present plan in the new project. In commenting editorially it goes on to say: "The proposal was to pay for part of the cost through local benefit assessments, part through fares—an eminently equitable arrangement, far in advance of anything yet carried out in rapid-transit construction in American cities. But, most unfortunately, there was pretty complete failure to organize a campaign for bringing the issue fully to understanding and acceptance. This seems to be the reason for the defeat of the proposal. Rapid transit must come in Detroit, and come soon, but with repeated failure on the part of civic interests to obtain the support of the people, its realization may be delayed so long as to work injury to the city."

The light vote is thought by some to have made it possible for opponents of the special-assessment plan who feared that they might be unfavorably affected by this feature to exert a disproportionate influence. The recommended financing scheme called for 51 per cent of the cost to be met by assessments on benefited property along the subway, 17 per cent by a general tax, and 32 per cent out of the revenues from a 10-cent fare. The special assessments were to be levied at the end of five years, during which the enhancement of property values due to the subway was to be studied and determined, and the bonds were thereupon to be retired.

Fire Protection for Municipal Airports

By H. E. NEWELL
ENGINEER, NATIONAL BOARD OF FIRE UNDERWRITERS

WHEN determining fire protection for airports, it is of course necessary to consider the types of construction encountered and the important features of heights and areas.

To date, there are three prevalent types of construction employed for hangars; namely, frame, sheet metal and masonry walls. With each of these types is usually a wooden roof, generally protected by a fire-resistive covering and supported by steel or built-up trusses. The masonry type of construction with some variations is generally employed by the larger transport companies and many of the cities that have more recently built airports. The sheet-metal hangar is extensively employed; frame hangars are found at the older landing fields. In some cases hangars are used for general shop and repair purposes, and in such cases, mezzanines are frequently constructed in order to provide storage facilities. Frequently the hangar is constructed with lean-tos on two sides, housing repair shop, heating equipment, offices and rest rooms for pilots, etc. In order to simplify the heating problem, the Army has adopted the plan of suspending a poured gypsum ceiling in such a manner as to encase the lower chord of the roof trusses and ceiling off the space above.

Heights are necessarily great and the clearance from floor to bottom of lower chord is steadily increasing in order to keep pace with the increase in size of aeroplanes. The proposed National Board regulations provide for a maximum clearance of 25 feet, but this is objected to on the ground that this may bar plane designs now contemplated. To this clearance there must be added the height of the truss. Of course the feature of height is important from the fire-protection viewpoint in that it affects the design of sprinkler systems and the efficiency of hose streams.

Two-Story Hangar Contemplated

Up to the present we have not encountered other than single-story hangars, but in the last draft of the National Board regulations, provisions have been made for two-story hangars. There is a popular belief that there is plenty of space at the average airport for hangars, but the aeronautics interests tell us that this is not the case and that space is at a premium. We have not provided for basements beneath hangars, and here too the aeronautics interests insist that basements must eventually be resorted to in order to conserve space. Thus our conception of well-spaced hangars is probably all wrong and what we really must contemplate is more or less congestion of one- and two-story basement hangars, a condition which will render the fire protection problem more difficult. Basements are objectionable in that they form pockets wherein vapors are liable to accumulate. The position of the National Board has been that inasmuch as to date no basement type of hangar has been constructed, basements should not be recognized until their need is proven by economical developments.

The question of the area of a hangar is a vital one to both the fire-insurance interests and to the operating concern. Where structures are of large area, the item of fire protection becomes a serious matter; any experienced fire chief will tell you that in a large area building, hose streams cannot reach all parts and therefore fire fighting in that manner is such that heavy or total losses of contents and of buildings, if not of fireproof construction, are sure to be common. This is not typical of hangars alone, but is true of all classes of occupancy. For this reason it has appeared fundamental to adopt as a standard a hangar area of only moderately large size and to recognize increases in dimensions only where protective appliances are provided, which will, through automatic operation, catch many fires in their incipient stage. Of even more importance, if the fire is not extinguished, these devices, such as automatic sprinkler systems, will cool the air down below the ignition point of the material in storage and will largely clear up the smoke so that men can enter and extinguish the remaining fire.

Dangers of Crowding Large Hangars

The areas of older hangars are relatively small, that is, around 6,000 to 8,000 square feet, but in recent years areas of 9,000 to about 14,000 square feet are common practice. The tendency at present is to considerably exceed these areas. The various tentative drafts of the proposed National Board regulations limit an unsprinklered hangar to 10,000 square feet; sprinklered hangars are limited to 25,000 square feet, and there is a provision whereby a sprinklered area may be further increased to 30,000 square feet if the average height does not exceed 20 feet. The industry objects to the unsprinklered limitation and has urged that this be changed to a greater figure; the recommendations for this increase have varied from 12,000 to 16,000 square feet. As will be noted later on, the industry does not regard the installation of automatic sprinklers favorably and the feeling apparently is that if sprinklers are to be insisted upon the proposed unsprinklered area limitation should be considerably increased.

The industry has pointed out that many of the tri-motored planes have wing spreads as great as 90 feet and that it is probable that these wing spreads will be greatly exceeded in the relatively near future. For this reason it is claimed that large areas are highly essential. While the needs of the industry must be recognized and requirements

Checking the Fire Hazard at Our Municipal Airports

For the past year, the National Board of Fire Underwriters, with the cooperation of the Aeronautics Branch of the Department of Commerce, has been working on provisions for the proper construction and protection of airports. These suggested measures have been discussed with members of the aviation industry at meetings in Washington and Chicago, and substantial agreement reached on most of them. This paper by H. E. Nichols, a member of the Engineering Staff of the National Board of Fire Underwriters, was presented at the National Fire Protection Association convention in Memphis, Tenn., on May 14. It embodies a discussion of the fire protective methods advocated by the National Board and approved in general by leaders in the aviation field. Since the paper is the latest word on this vital phase of airport development, THE AMERICAN CITY offers it here as a guide for municipal officials grappling with that problem.

en drawn as to avoid hampering and preventing development, the industry must be made to realize the danger of excessive areas. With such large areas it is readily possible that all the planes of a transport corporation, let us say for purposes of illustration, may be housed in a single hangar and this means that the entire transportation service of a single company may be endangered by one fire. It is the practice to utilize hangar space to the greatest advantage, and this means that planes are dovetailed in with wing surfaces overlapping and in general so stored as to promote the spread of fire from plane to plane. Some of the larger transport companies have perfected designs for hangars so arranged as to permit the storing of planes in fixed positions. With this arrangement the plane is taken into the hangar by a "dolly" and stored in a fixed position. This arangement is highly commendable and might possibly permit the salvaging of some of the planes if a fire is discovered in its incipiency.

From the foregoing it will be perceived that the question of fire protection at an airport is a real problem and one that is not so easily solved as might be expected.

Fire Hazards at Airports

Before proceeding with the discussion of the question of protection, however, let us briefly consider the character of hazards encountered at an airport. There is, of course, the common hazard incident to electricity for light and power. Heating, too, is a feature that must be given consideration. This is illustrated by the fact that one of the most serious hangar fires to date originated in the heating section of a hangar lean-to, spread to the hangar, largely destroyed it and included several Liberty engines. Heating systems should unquestionably be safeguarded as in the case of a public garage.

It is conceded that the starting or operation of airplane motors within hangars is a dangerous practice and should be prohibited. There are also present the various hazards in connection with the making of repairs, and it is of course obvious that the repair shop be suitably cut off from the hangar and the type of repairs permitted in the hangar limited to inspections and replacements of parts or repairs incident thereto. In this connection, it will be frequently found that oxy-acetylene welding, small-scale spraying operations and the washing of parts in flammable liquids are carried on within the hangar. These, are of course, highly hazardous processes which should not be permitted. These practices are more or less the result of the rapid growth of the industry and indicate the need of educational methods in order to acquaint the industry with the dangers that may result from such practices. The National Boards proposed requirements touch on all of these hazards and recommend suitable safeguards.

At some of the larger airports, especially the terminals of the larger transport lines, will be found facilities for repairs to an extent which approximates those of an airplane factory. In some cases there will be found extensive woodworking sections in connection with building of wings, and "doping" rooms, for treating the wing surfaces with nitrocellulose "dope." This "dope," as it is commonly termed, consists of cellulose nitrate or cellulose acetate dissolved almost always in a volatile flammable solvent. The solvents used are various and the exact compositions are trade secrets, but it is definitely known that acetone, amylacetate, alcohol and others of similar hazard are used for this purpose. Both the acetate and nitro-cellulose "dope" are hazardous when wet with the solvent, partaking of the hazard of the solvent. The nitro-cellulose "dope," however, is more hazardous when wet, and is also very hazardous when dry, the film which it forms on the coated surface being similar to pyroxylin in respect to hazard. The dry acetate "dope" does not burn freely, being similar in composition to the slow-burning type of motion picture film. With both types, however, the process of applying them and the presence of freshly "doped" surfaces introduce a distinct and severe hazard calling for special measures of protection. The National Board requirements provide that the process of "doping" shall be carried on in a detached incombustible sprinklered or otherwise suitably protected building. This process is similar to the spraying of pyroxylin finishes and should be similarly safeguarded.

The storage of flammable liquids, including those used in connection with "doping," should be in compliance with the National Board rules on these subjects. Airplane reservoirs should be filled outside the hangar. It is also important that in connection with filling operations suitable safeguards against the hazard of static electricity be provided. It is stated that the passage of planes through the air, especially those of the all-metal type, results in the building up of a charge of static, hence the plane itself should be grounded before connection is made to the fill pipe. When the plane is stored in the hangar, there is always the possibility of leakage from carburetors, and to safeguard this the National Board's proposed requirements provide for the placing of metal pans beneath the plane. There is also present the hazard due to the accumulations of rubbish, oily waste, and the storage of greasy overalls and clothing, and smoking. These hazards are of course encountered in numerous other industries and similar safeguards should therefore be provided.

Inside Protection and Sprinklers

In discussing protection requirements, let us first consider inside protection. The engineering staff of the National Board of Fire Underwriters is of the opinion that the nature of occupancy is susceptible to protection by automatic sprinklers, and as previously indicated, their proposed requirements provide for the installation of sprinkler systems when a specified area limitation is exceeded. The industry objects to the sprinkler requirement and takes the stand that its own experience and that of the Army and Navy clearly indicate the inability of automatic sprinklers to control airplane fires in hangars. It has been further pointed out that the method of storing planes, i.e., dove-tailing the planes and storing them in such a manner as to cause overlapping of wings, would prevent proper distribution of water and therefore permit a fire once well started to involve all the planes stored in the hangar.

This difference of opinion has led to an offer by the sprinkler industry to conduct tests in order to ascertain whether the claims of the aeronautical industry are correct. Arrangements have been made, through the cooperation of the Aeronautic Branch of the Department of Commerce, the Bureau of Standards and the Army, to conduct such tests sometime in the near future. The National Board has agreed to withhold the publication of requirements pending the outcome of these tests. Should these tests prove the contentions of the industry to be true, then the problem of interior protection will indeed be a difficult one. This will readily be seen by simply considering the large areas that have been referred to and the congested storage of extremely valuable planes. In connection with airplane values it is interesting to note that values range from around $2,500 for the smaller type plane to more than $75,000 for the large passenger plane. In buildings of such height and area, it probably would be hardly feasible to install inert gas extinguishing systems of the room-flooding type. In most cases, hangar doors are located at a single end, but in some cases doors are located at both ends of the hangar, and where the latter condition exists the difficulty of installing inert gas systems of the room-flooding type is obvious. Hangar doors being of such size and weight, it is questionable whether they

could be arranged to close automatically by a heat actuated device. In the opinion of the writer, however, no convincing reason has been advanced as to the inability of automatic sprinklers to cope with fires in hangars.

Sprinklers Effectiveness in Garages

The fact that to date, so far as known, no sprinkler system has been installed in a hangar is hardly a reasonable argument. It is claimed that a fire originating within a plane, due, for instance, to a broken gasoline line, would result in a fire of character and extent impossible to control by sprinklers. It is unquestionably true that a fire so originating would not lend itself to quick operation of the sprinklers, for the reason that the enclosure forming the fusilage of the plane would tend to confine the heat and retard its rise vertically. It should be realized, however, that a similar condition exists within a garage; the same arguments have in the past been advanced as to the possibilities of fire originating beneath an automobile or within it, permitting the spread of fire over a considerable area before sprinkler operation resulted, but actual experience proves that this is not a factor.

The April, 1929, N.F.P.A. Quarterly has this to say with reference to the fire record of garages equipped with automatic sprinkler systems:

"Included in the tabulation of fires occurring from January, 1921, to December, 1928, inclusixe, over 370 fires occurred in sprinklered garages. Of these fires there were 83 where sprinklers were not a factor, leaving 293 for analysis. Of these, 286 or 97 8/10 per cent, the sprinkler operation was satisfactory."

It is conceded that the airplane being of a more flammable nature and stored so as to permit wing overlapping, as previously described, might very likely result in the destruction of more than one plane before the sprinklers controlled the fire. It also seems probable that in designing a sprinkler system for installation in a hangar, this condition of storage would have to be recognized, but this is an engineering detail which undoubtedly can be worked out. Another factor that should be borne in mind is that all of the fires by no means originate within the plane; many are due to common causes and originate outside of the plane, and in such cases there is no reason why sprinklers should not prove as effective as under similar conditions in other industries; further, it has been well established that water is the most effective medium for extinguishing fires involving nitro-cellulose. It has also been demonstrated that the automatic sprinkler is capable of controlling incipient fires involving gasoline. This discussion, however, is simply to provide a background on which the writer's opinions are based. So long as tests are contemplated and will probably be made, perhaps the fair thing to do is to withhold final judgment pending their outcome.

For first-aid protection there are available various types of equipment suitable for the character of fires that may be expected. Foam, carbon-dioxide and carbon-tetrachloride extinguishers have their place. The standpipe, too, is a valuable type of fire protection equipment to have in a hangar. The lowly sand pail and also a mixture of sawdust and soda have their place, being easily maintained and suitable for use on oil and grease fires.

Private Water-Supply Systems

When not located within the limits of a protected city or town, every airport should be provided with a private water-supply system of adequate capacity and including distributing mains and fire hydrants of such size, number and location as to permit of concentration of a sufficient number of streams on any building that might be involved. If, as noted earlier in this discussion, we may expect to find congestion of hangars and other buildings, the necessity of an adequate water-supply system is increased.

It has been stated that when fires originate within the hangar and involve planes, the duration is usually about one-half hour, i.e., at the end of this period the planes are all consumed. This would tend to emphasize the importance of automatic means for the detection and control of fires in their incipiency; on the other hand, assuming the contents of a hangar were consumed in such a short period, it does not necessarily follow that the hangar itself and immediately adjacent buildings would likewise be simultaneously destroyed. This is mentioned by way of stressing the importance of arranging for response of fire apparatus from the nearest municipality. In these days with automobile apparatus, considerable distances can be traveled in a relatively short time, and if the airport is provided with a good water-supply system, so that the apparatus from the nearest fire department can go to work on arrival, a considerable portion of the airport buildings may be saved.

If there is fair individual separation of hangars and other airport buildings, supplemented by a water-supply system, the chances are the fire department will be able to confine the fire to the building of origin. Of course, if the airport is located within a city and consequently under the protection of the municipal fire department, the problem is greatly simplified as it is assumed that this would automatically mean an extension of the city water-supply system throughout the airport. In the design of private water-supply systems for airports, it is of course obvious that a direct hydrant stream basis would prove most effective, as this would permit a well-organized fire brigade to do effective work pending the arrival of outside aid. Such systems also assume sufficient hose on hose reels supplemented by hose spanners, hydrant wrenches, etc.

Transmitting Fire Alarms

The airport under city protection should, of course, be equipped with an adequate number of city fire-alarm boxes in order to afford means for promptly notifying the fire department in case of fire. In cases where the airport is located outside of city protection, some means should be provided for the reporting of fires and summoning aid. If the airport is of considerable extent, a fire-alarm system should be installed; in other cases these needs may be met by a sufficient number of telephones, supplemented by a well-thought-out procedure for promptly transmitting the alarm to the nearest city fire department and to the volunteer brigade.

Each airport should be provided, as inferred above, with a well organized and drilled private fire brigade. The chief of the brigade might well be charged with the maintenance of all first-aid and other private fire-fighting equipment. Either he or an assistant should make periodical inspections of all hangars and other buildings in order to ensure that all safeguards are in proper condition and to discover any hazardous conditions which may exist.

With airports protected as above described, the progress of this new industry should not be retarded by serious fires.

Everybody Pays When the Forests Go

IN every part of the country where forests are cut down with no provision for immediate regrowth, the economic effects reach out far beyond the lumber industry; industries move away, wages are reduced, bank deposits decrease; farmers lose their markets; railroad revenues shrink; schools deteriorate; good roads are fewer; tax burdens pile up, abandoned farms abound. The complete cycle of high-pressure timber production, followed by desolation, is strikingly presented in Technical Bulletin 92 of the Department of Agriculture, entitled "The Economic Aspects of Forest Destruction in Northern Michigan," obtainable while the supply lasts from the Office of Information of that Department, Washington, D. C.

How Los Angeles Keeps Its Water Pure

By H. A. VAN NORMAN

General Manager and Chief Engineer, Los Angeles Department of Water and Power

EVERY city has its water problems. Large, or small, the American city encounters at one time or another, or at all times, the question of water purity. Some great metropolitan centers face the necessity of *making* the water pure by processes of special treatment. In Los Angeles, the third largest water distributing system in the United States, the task is one of *keeping* the water pure.

The efficacy of the methods pursued by Los Angeles to keep its water pure is seen in the records which disclose that Los Angeles has never had a case of water-borne disease in the history of the municipal operation of the water system.

A VIEW FROM THE OWENS RIVER, SOURCE OF THE LOS ANGELES AQUEDUCT WATER-SUPPLY

Source of Supply

The Los Angeles River, original source of the local water-supply, has been overtaxed by the great influx of people in the past quarter-century, but the river still continues to contribute about 60 second-feet. The water flows through the gravel beneath the surface of the stream-bed, thus making it the more valuable as a domestic water-source. No surface water is used for domestic purposes by Los Angeles.

For nearly 150 years the Los Angeles River has served the city. From the day the pueblo was founded, in 1781, the river supply has been used by residents. Even today the river furnishes water to a territory of 40 square miles in the hill areas in the north and northeast sections of the city and the original business district. The remaining and scattered area of 400 square miles receives its water from the Los Angeles aqueduct.

From the point where the Los Angeles River rises, on the outskirts of the city, approximately 100 wells varying from 12 to 40 inches in diameter are operated. During the winter the wells flow by gravity into the conduit, thence into storage reservoirs. In the summer season water is pumped from these wells. The river supplies the wells.

Three galleries are in place below the bed of the stream. They receive water which has filtered through the layers of gravel and sand. The original gallery, placed more than 50 years ago, is still in operation. Since that time others have been installed.

The deepest gallery is 180 feet below the river-bed. It has been in operation more than a decade. The shallowest gallery is the longest. This infiltration gallery, extending more than a mile, was placed four years ago. The water filtering through the gravel is picked up by a 48-inch concrete pipe through a system of perforations. The pipe line is connected with the other infiltration lines of the river-bed.

A DIVERSION WIER CARRYING WATER FROM A BY-PASS CONDUIT TO A RESERVOIR SERVING TO AERATE THE WATER

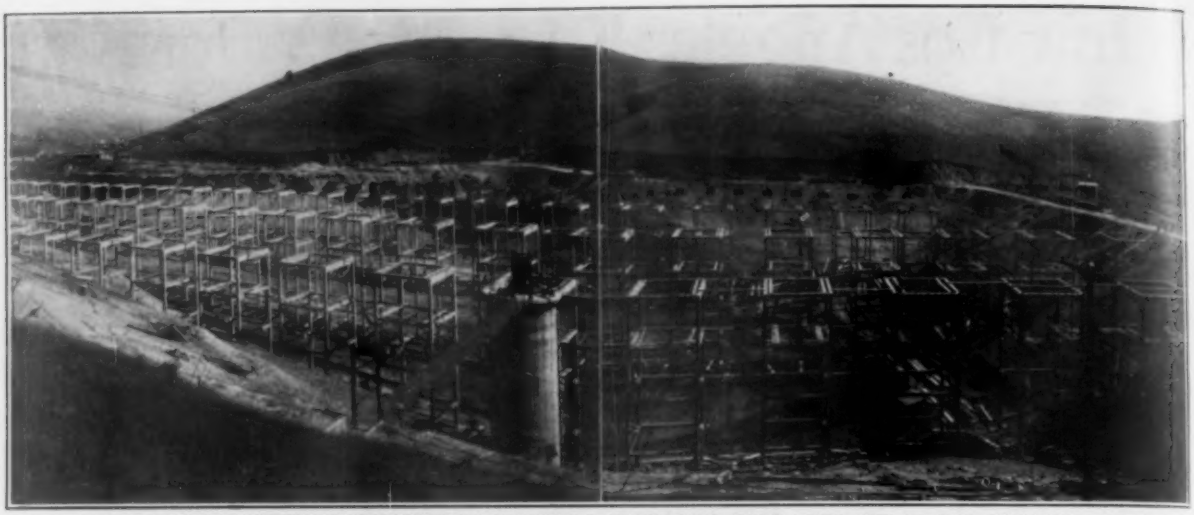
The Owens Valley Supply

Dependable as the Los Angeles River has been for more than a century in supplying water, the growth of the city demanded a larger supply. Twenty-one years ago Los Angeles tapped the High Sierras. A 250-mile aqueduct was built at a cost of $24,500,000 and was completed in six years, the final work being done in 1913. More than 500 miles of highways and trails were opened and a railroad of 120 miles was constructed to care for the transportation of materials and men.

From its intake in Owens Valley, at the foot of Mount Whitney, highest point in the United States, the aqueduct passes over foothills, across the Mojave Desert and into Los Angeles. The aqueduct goes through 142 separate tunnels totaling 53 miles in length. There are 12 miles of inverted steel siphons from 7 to 11 feet in diameter, 24 miles of open unlined conduit, 39 miles of open cement-lined conduit, and 97 miles of covered conduit.

Storage Reservoirs

Aqueduct water empties into 28 storage reservoirs along its route and at its terminus. In addition, water is pumped to more than a dozen water storage tanks within the city. The aqueduct storage reservoirs situated within the city limits are in the San Fernando Val-



STEEL AND CONCRETE FRAMEWORK INSTALLED TO SUPPORT A SEVEN-ACRE ROOF OVER ONE OF LOS ANGELES' 28 WATER-STORAGE RESERVOIRS

ley and in several of the canyons in the Santa Monica mountain range.

In picking sites for Los Angeles' water storage reservoirs, utility and service are of primary importance. Many of them are in inaccessible places, all fenced and guarded against trespassers. The fences average 7 feet in height and are of the finest "hog-proof" type surmounted in many instances by three strands of barbed wire.

Around close-in reservoirs the Department has constructed concrete diversion walls approximately 3 feet in height which serve to by-pass all storm water from nearby hillsides that otherwise would drain into the reservoirs. This method prevents any surface water whatsoever from entering any of the aqueduct reservoirs situated within the city.

The smallest reservoir has a capacity of 760,000 gallons; the largest, the Haiwee reservoir situated in Owens Valley, 19,551,000,000 gallons. The tanks vary from 138,000 gallons capacity to 8,550,000. The combined capacity of all tanks and storage reservoirs is 38,124,567,000 gallons.

The larger reservoirs of the system are stocked with fish, which serve as a purifying agency to keep down insect life. Insects swarm over the surface of any body of water. If the fish become too plentiful they are seined out. No fishing is permitted. Every spring, reel and rod men of the community attempt to secure permission to fish in the reservoirs. The city has blocked every effort to throw the reservoirs open to fishermen. This prohibition is, of course, one of the many precautions taken to preserve the reservoirs absolutely free from pollution and contamination.

When the water leaves its mountain source it is pure; when it empties into the dozens of reservoirs, it is pure; and when it passes into the 3,200 miles of water-mains to meet the needs of 1,300,000 men, women and children, it is pure.

PART OF THE WATER-CHLORINATING EQUIPMENT WHICH IS ON THE JOB 24 HOURS A DAY

Eternal Vigilance of Laboratory Analysts

In its vigilant effort to check the water seven days a week, and in covering the system with its tests, the Department of Water and Power takes at least 24,000 samples a year. The average test in these samples from month to month shows from 97 to 99 per cent freedom from colon bacilli. The thoroughness of the checks against possible pollution is indicated by a recent case. Our bacteriological department uncovered a condition in a nearby storage reservoir. At one end of which, samples showed positive in the test for colon bacilli. Tracing to a nearby construction camp, the investigators found a mule yard. The animals were removed, but the test continued to show positive. However, continued investigation and checks at the other end of the reservoir showed that roots had penetrated an outlet pipe from a sewer-main and had backed up against the water-level. The condition was remedied at once.

Five portions of 10 cubic centimeters each are examined from every sample. Not more than 10 per cent of all the 10 cubic centimeter portions are permitted to show the presence of organisms of the colon group.

Samples are taken from all reservoirs, from taps in every section of the city, and from the aqueduct. Thus every possible water-carrying and storage medium is carefully checked.

Algae Troubles

Algae are the bugaboo of many water systems. Algae, of themselves, are quite harmless. Indeed, scientists declare they are beneficial to water. They are a vegetable growth that germinates and

thrives under the rays of the sun. The harm algae bring is due to the offensive odor the growth spreads over the water.

Where algae are likely to grow, Los Angeles builds roofs to shut out the sun rays. In many of the reservoirs this is not necessary. Recently, Los Angeles spent $120,000 to roof one of its reservoirs to keep the water free from algae. The task of roofing the 7-acre reservoir entailed the building of a huge concrete framework not unlike the skeleton of a skyscraper. More than 1,200 cubic feet of concrete and 175 tons of steel went into the frames which support the 190 80-foot trusses on which the roof rests.

Methods of Sterilization

To maintain an unvarying process of sterilization, engineers in the Department of Water and Power have developed automatic sterilization machines. Three electric-driven pumps are installed in each sterilizing unit. Two of the pumps are held in reserve. The function of the pump is to force the sterilizing medium into the water being treated. If one of the pumps ceases to operate, a starter is tripped and a gas engine pump put into motion. The man in charge of the plant is able then to turn on one of the reserve electric pumps without interference in the sterilizing.

Service Zones

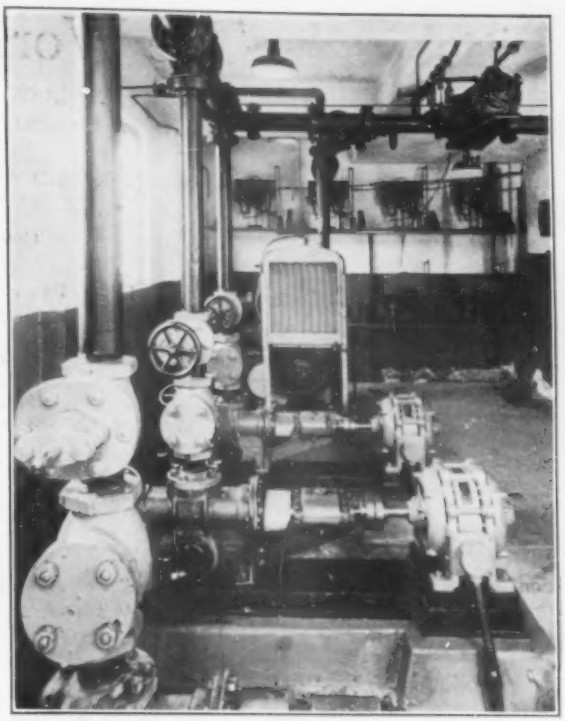
The Los Angeles municipal water system serves 58,400,000,000 gallons of domestic water a year to residents of the city in an area of 440 square miles. The water is served at levels varying all the way from sea-level to an elevation of 1,400 feet. The highest single lift is 900 feet.

The city is divided into nine distinct zones or levels. The pressure must be maintained despite the change in altitude. The pressure maintenance is around 60 pounds and never below 40 pounds.

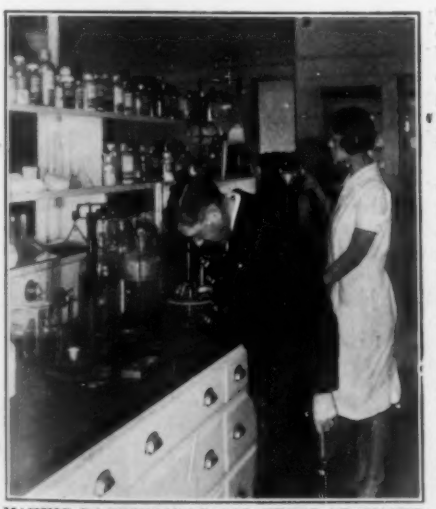
By virtue of its widely scattered territory and diversity of elevations, the distribution offers a complex problem. Los Angeles with its 3,200 miles of watermains is second in size only to New York, is 400 miles larger than Chicago, and 600 miles more extensive than Philadelphia.

Traveling as it does over 250 miles of aqueduct, Los Angeles water needs air. Confined in pipe for such a distance, the oxygen is necessarily consumed. To meet this exigency the water is aerated. Before it flows into one of the large reservoirs north of the city it passes into an aerating canal. Needed oxygen is thus supplied to keep the water sparkling and palatable.

In the larger reservoirs the action of the sun and wind keeps the water constantly and sufficiently aerated. Systematic flushing of the mains also is beneficial along this line.



THE AUTOMATIC PUMP SYSTEM DEVELOPED BY THE LOS ANGELES DEPARTMENT OF WATER AND POWER FOR PUMPING CHLORINE SOLUTION INTO THE WATER MAINS



MAKING BACTERIOLOGICAL TESTS OF WATER TAKEN FROM THE VARIOUS RESERVOIRS THROUGHOUT THE LOS ANGELES WATER SYSTEM

Red Cross Develops Technique for Disaster Relief Readiness

HUNDREDS of Red Cross chapters all over the country are interested in the improvement of their disaster committees. These chapters are composed of "live" people—people who execute their voluntarily assumed duties in a practical way. They want not only the substance of a plan for action, but the plan itself, direct, concrete, and simple, according to Vice-Chairman James L. Fieser, in a recent issue of the *Red Cross Courier*, who adds: "They welcome the adoption of a plan with the minimum of 'slack' in the working parts of the relief machinery.

"Chapters which have not yet set up their disaster organization, may therefore find one inspiration to activity in a concrete example of the methods of attaining an efficient set-up. For this purpose let us take the skeleton outline of the report of the Trumbull County Chapter, with headquarters at Warren, Ohio.

"At a luncheon meeting, with a guest speaker, the plan of a Disaster Preparedness and Relief Committee was adopted, with the chapter chairman and the mayor of the city as two of the members, with committees on medical aid, nursing service, food transportation, finance, clothing, and shelter. County representatives from six communities were included on the Committee." Things to be done included:

The names, addresses, telephone numbers of committee members to be posted at Chapter headquarters, at the mayor's office, police headquarters, court-house.

A directory of available personnel and equipment throughout the county, to be made, taking in:

1. Physicians
2. Nurses
3. Beds and cots (in hospitals; from Boy Scout Troops)
4. Drug supplies locally and from nearby wholesalers
5. Staple groceries locally, also wholesale stocks
6. County-owned trucks, tractors, other equipment and available personnel, also shelter, in cooperation with the county commissioners
7. Arrangement with railroad companies for free transportation in case of absolute necessity, of personnel and supplies

This plan, says Mr. Fieser, stresses resources available for emergency demand, supported as needed by the network of support which the national organization or home office is always ready to give if a disaster is extensive or multiple in character. The national and branch offices, it is added, are eager to advise on all matters of organization of disaster relief committees where chapters wish to be prepared before disaster strikes.

Pittsburgh—The World's Third Federated City

By ROWLAND A. EGGER
DEPARTMENT OF POLITICAL SCIENCE, UNIVERSITY OF MICHIGAN

AFTER six years of painstaking research, the Pittsburgh Metropolitan Plan Commission has submitted its proposal for the federation of the cities, boroughs, and townships of Allegheny County in what promises to be the outstanding achievement in local government during the present decade.[1] The charter for the new "City of Pittsburgh," as the metropolitan region is designated, was submitted on March 11, 1929, to the Legislature, under the authority of a constitutional amendment adopted last November. The chart beginning on this page indicates the distribution of functions between the consolidated city and the municipal divisions as proposed by the Commission; on the next page is also given a list of such revisions as were made by the Legislature. This revised charter goes to the electorate of Allegheny County on May 25, when it will, almost without question, be adopted.[2]

The Commission proposed that the consolidated city should be governed by a board of seven commissioners elected by wards, and a president of the board to be elected at large. The president was the administrative head of the city, and exercised complete supervisory and investigational powers, as well as appointing, by and with the consent of the commission, all department heads and other officers and boards provided in the charter. The charter further provided for the establishment of departments of finance, health, safety, public works, welfare, parks and recreation, planning, public art, personnel, law, research and information, and regional transit. The Legislature eliminated all of these ex-

(*Continued in third column of next page*)

[1] For a description of the region and an outline of the proposed unification see Reed, T. H., "Pittsburgh Plans the World's Most Complete Experiment in Federated City Government," XXXVI THE AMERICAN CITY, p. 506 (May, 1927). Other federated cities are London (1888) and Berlin (1920).

[2] As successor to the county of Allegheny the consolidated city received, under the Commission's proposal, all the property, rights, interests, claims, and causes of action now possessed by the county and directors of the poor of Allegheny County, and all works, buildings, and property of the several cities, boroughs, and townships of the county now devoted to the care of the poor, aged, indigent, feeble-minded and insane. The legislature, however, retained the present organization for the care of the poor, so that the consolidated city succeeds only to the powers and property of the county corporation. The consolidated city receives such bridges and streets as may be designated by the consolidated city as through-traffic thoroughfares. It assumes also the debt of the present county of Allegheny.

A two-thirds vote in a majority of the units is required for adoption of the charter; but it may be amended by majority vote in the county, and functional reallocation requires only a majority vote in a majority of the units.

PROPOSED ALLOCATION OF FUNCTIONS BETWEEN CONSOLIDATED CITY AND MUNICIPAL DIVISIONS

Consolidated City	*Municipal Divisions*
1. FINANCE	
1 (a). Power to levy taxes and impose special assessments for the purposes of the consolidated city.	1 (a). All financial powers now exercised under the laws of Pennsylvania, or which may be conferred thereby, except the power now possessed by the second and third class cities to assess property for taxation.
1 (b). Exclusive power to assess persons and property within the consolidated city for taxation.	
1 (c). Decision of tax appeals involving adjustments between individual parcels of property and between municipal divisions.	
2. HEALTH	
2 (a). Power to make regulations in addition to and not inconsistent with state laws.	2 (a). Power to make regulations in addition to and not inconsistent with state laws or regulations of consolidated city.
2 (b). Power directly to administer health functions in municipal divisions without health boards of competent jurisdiction, and in all cases where conditions endanger the safety of persons residing outside the municipal division. The costs of such administration to be charged against the municipal division.	2 (b). Municipal divisions having health boards of competent jurisdiction are authorized to administer local health functions in accordance with above.
2 (c) Power permanently to assume, with the consent of the people thereof, the administration of health functions in any division or divisions. The costs of such administration are to be charged against the municipal division.	
3. WELFARE	
3 (a). Administration of family welfare, care of dependent children, aged and infirm, administration of psychiatric clinic, institutional care of the insane, administration of all correctional institutions, and the conducting of quarterly conferences for the improvement of welfare administration.	
4-A. PLANNING	
4 (a). Full charge, control and direction of all basic geodetic, topographic, street and boundary line surveys throughout the consolidated city.	
4 (b). Formation and enforcement of a master plan for the consolidated city.	4 (b). Formation and enforcement of a town plan not inconsistent with the outlines of the master plan.
4 (c). Formation of regulations for the subdivision of land: *a*. General within divisions having planning commissions of competent jurisdiction. *b*. Detailed as to areas not having such commissions.	
4 (d). Approval of subdivision plats, in addition to the approval of same in divisions requiring such by division authorities.	4 (d). Approval of subdivision plats in divisions with planning boards of competent jurisdiction.
4-B. ZONING	
4 (e). Power, after 1933, to create districts for the purpose of regulating the location, height, area, bulk, and use of buildings and premises, and to enforce such regulations.	4 (e). Power, until 1933, to exercise zoning prerogatives enjoyed under Pennsylvania law. If by that time any municipal division has not zoned, the consolidated city shall zone same.

5. Safety

5 (a). Maintenance and control of a small, mobile police force of the consolidated city.

5 (b). Power to assist the local police of any division upon request of same. The costs of such assistance are to be borne by the municipal division.

5 (c). Power either temporarily or permanently to assume the safety administration of any municipal division or divisions upon request of same. The costs of such administration are to be borne by the municipal division.

5 (d). Administration of consolidated city detective bureau. Power to assume detective functions of municipal divisions upon request of same.

5 (e). Power to make and enforce necessary regulations concerning the control of traffic on through-traffic streets.

5 (f). Power to regulate by ordinance the production or emission of smoke from any source, and the future construction or rebuilding of all chimneys, stacks, etc. Inspectional powers concerning same.

5 (g). Power to make regulations with regard to the prevention of fire, and to exercise the functions at present exercised by the fire marshal of Allegheny County.

5 (h). Power to recommend by ordinance standards for the operation of the volunteer and paid fire departments of the municipal divisions, and to make appropriations in aid of such departments, provided said departments conform to the standards recommended.

5 (a). Maintenance and control of local police.

5 (d). Maintenance and control of local detective bureaus.

5 (e). Power to regulate traffic on all except through-traffic streets within the division. Duty to assist in the enforcement of the regulations of the consolidated city concerning through-street traffic.

5 (g). Power further to regulate not inconsistently with the regulations of the consolidated city.

5 (h). Maintenance and control of local fire departments.

5 (i). All other safety functions permitted to the several classes of municipal divisions under the laws of Pennsylvania.

6. Public Works

6 (a). Power to create special utility districts within the consolidated city for the provision of utilities affecting more than one municipal division.

6 (b). Power to acquire facilities, or to contract therefor, for the supply of water to municipal divisions or private distributing companies, except in municipal divisions which have not surrendered their powers in regard to water supply.

6 (c). Power to acquire facilities, or to contract therefor, for the supply of transportation facilities within and without the consolidated city.

6 (d). Power to designate through-traffic streets to be henceforth maintained by the consolidated city, but not including the cleaning and lighting of same.

6 (e). Power to assume, with the permission of the municipal division, the ownership and management of any utility or public work of the same, the indebtedness thereof, and the responsibility for the supply of the service thereto.

6 (b). All powers relating to water supply at present exercised under the laws of Pennsylvania and not voluntarily surrendered to the consolidated city.

6 (c). All powers relating to transit at present exercised under the laws of Pennsylvania.

6 (d). Present powers and duties with regard to all other streets.

6 (f). All functions permitted under the laws of Pennsylvania and not reserved to the consolidated city in this charter.

7. Parks and Recreation

7 (a). Power to join with municipal divisions or school districts in the acquisition, improvement, maintenance, and operation of parks, playgrounds, and other recreational facilities.

7 (a). Maintenance and operation of local recreational facilities.

8. Public Art

8 (a). Power to control through a central art jury all works of art to be erected in public places.

cept finance, public works, health, law, and regional transit. The office of director of finance was abolished and his functions vested in the controller. The present county board of commissioners was continued as the governing body of the city for its first two years. Administrative reorganization and integration proposed by the Metropolitan Plan Commission was rejected, and the whole matter placed at the discretion of the commission of the consolidated city. Municipal court reorganization and the introduction of civil service were also rejected by the legislature.

Enough of the Commission's charter is left, however, to provide substantial consolidation along federated lines. The federal principle, it should be noted, was not attacked in the Legislature; only the reform features of the charter which threatened the control of the "organization" were excised. The Commission, and Professor Reed, its consultant, are to be congratulated upon their outstanding contribution to the science of politics, for unquestionably this federation will type the future solutions to the problems of metropolitan government in the United States.

REVISION OF LEGISLATURE

1. Finance

1 (b). *Exclusive* written out. Second and third class cities may assess for taxation according to own standards. (The consolidated city reassesses *all* property for the taxes which it levies.)

2. Health

2 (b). Consolidated city may not interfere without permission of authorities thereof in the health administration of any municipal division authorized to employ a health officer. It may not charge a municipal division not so empowered for services rendered in this connection.

3. Welfare

3. Department abolished. Present county poor directors retained, with no correlation between county and municipal divisions.

4-A. Planning

4. Department abolished. Consolidated city succeeds only to planning powers granted by state law to counties of the second class, which are entirely negligible.

4-B. Zoning

4 (e). In any municipal division having an ordinance inconsistent with the regulations of the consolidated city, the ordinance of the division shall prevail.

5. Safety

5. Department abolished. Provision of police force of consolidated city left to discretion of commissioners.

5 (h). Provision rejected as to subsidization by consolidated city.

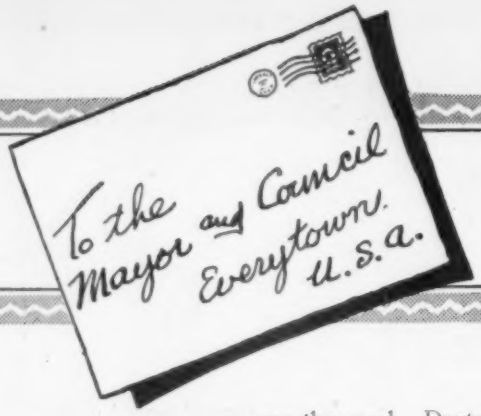
7. Parks and Recreation

7. Department abolished.

8. Public Art

8. Department abolished.

A MONTHLY OPEN LETTER



June 1, 1929

Honorable Sirs:

MANY years ago, Lowell exclaimed, "What is so rare as a day in June?" Much more recently Joyce Kilmer wrote, "I think that I shall never see a poem lovely as a tree." And surely there can be nothing of rarer beauty than a tree in this happy month.

In our cities we have sacrificed many things to live close to our work and one another. The long lanes of lovely trees, that once arched and shaded residential streets, have gone in our larger cities and are disappearing in our smaller ones. Moisture-resisting pavement, noxious odors from automobiles, overhead wires and numerous other circumstances are killing off the trees in our streets. A little care would doubtless spare us a great many, but if we may judge from such cities as New York and Chicago, they are ultimately doomed.

Our city-surrounded parks—little oases in vast deserts of asphalt and concrete—are suffering from too intense use and from the same host of conditions unfavorable to plant life. The care we take to rake up the leaves with which nature would nourish trees, the manner in which we allow the earth about them to become hard and tight, causing rain-water to run off or soak too rapidly below the root level, are real problems of park care. Our parks may some day be as cheerless and unattractive as today many of them are formal and unnatural.

THE answer is large tracts of raw land planted in stately trees and kept in as natural a state as circumstances will permit. Not only is this an important—almost imperative—adjunct to any intelligently planned park system, but offers at least three equally significant advantages:

(1) It is a good investment, both from the standpoint of real estate values and the sale of timber after twenty-five or thirty years.

(2) Properly coordinated with a water-shed, it naturally conserves and governs water and water flow.

(3) In these days when our forest lands are rapidly being denuded, it is capable of serving an important place in our national conservation program.

HOWEVER expensive such land may be to acquire, it will never be cheaper. Cut-over land in neighborhoods of our cities can be had for surprisingly little money. Carefully planted with the cooperation of the state department of agriculture at a trivial cost, it requires little care. Then some fine day your city has a priceless and perpetual treasure. Every few years a bit of judicious thinning will yield a tidy revenue. The city of Little Falls, N. Y., with 14,000 population, owns 4,000 acres of choice timberland acquired in 1896. A year or two ago the city sold off 5,000,000 board feet without impairment of the forest preserve. Pittsfield, Mass., has 3,000 acres. It has found reforesting amazingly inexpensive. It set out, a few years ago, some 600,000 trees from its own nursery, at a cost of $6.50 per thousand. Dayton, Ohio, has a 7,000-acre tract as part of its flood protection plan. Newark, N. J., has 20,000 acres in its water-shed. The largest strictly forest enterprises are those of Salt Lake City in Utah, consisting of 25,000 acres, and Chicago's 35,000.

This splendid Chicago reserve cost less than $15,000,000 to acquire. A conservative estimate could scarcely place its present worth at less than three times that amount. But it is worth far more than this to the people of Chicago. In a single summer month a general attendance of as many as 2,000,000 persons is frequently recorded. As time goes on it will be an even greater joy to the people.

IN some parts of Europe there are towns and small cities that own forests. These forests are on the outskirts of the community and the citizens go to them to picnic and rest. The school children go to them to study the birds, the flowers, the trees and the smaller animals. Near the forests are small mills. These mills are kept busy turning out lumber cut carefully, year after year, from the forest. In the towns are little industries making things used in every-day life, thus employing citizens and making the community prosperous.

In or near the great majority of American towns and cities are acres of land that once grew forest. Usually there are acres that are not working today. They are waste. But they can go back to work at their old trade. In many cases the town owns some of them, often because their owners failed to pay the taxes on this idle property, sometimes because the town is using part of it for a poorhouse or other institution. Generally such acres can be bought cheaply. There is the community's opportunity. It can set this land to work, plant trees upon it, protect it as it grows, use it as a sanctuary for wild life, make it a place to rest, and finally, draw upon it for a supply of wood for the common good and prosperity.

CONSERVATION is a national problem. The United States Forest Service estimates that the annual timber cut exceeds by three times the annual natural growth. It doesn't take much imagination to see what this ultimately would mean. Here is a great opportunity for our cities to surround themselves with breathing space. A small initial payment and you put nature to work for you. As one of Scott's characters advised: "Plant trees, my boy, they'll be growing while you're sleeping." This may not be good botany (consult your ten-year-old son or daughter on this point) but it is good advice. Here is something for nothing. Well, not quite nothing, but just a few dollars and a little imagination and patience.

And if this dollars-and-cents demonstration doesn't hit you, go for a stroll in the woods with your son or daughter next Sunday.

Yours cooperatively,

HINTSAND POINTERS.

Surveying the Public Park and Recreation Facilities and Needs of a Metropolitan District

A Graphic Method of Showing How Facilities Compare with Needs, and of Creating Sentiment to Meet These Needs

By W. C. BATCHELOR

Superintendent of Recreation, City of Pittsburgh, Pa.

ABOUT two years ago a commission was appointed by the Governor of the state of Pennsylvania to study municipal consolidation in Allegheny County with a view to creating a metropolitan city with the present city of Pittsburgh as the center. The proposed Metropolitan City of Pittsburgh will include the entire area of Allegheny County, and its boundaries will be coterminous with those of the county. With an area of 725 square miles, embracing 122 independent governmental units and having an estimated population of 1,272,839 in 1925, this is a considerably larger territory than has been consolidated under a single metropolitan government up to the present time.

While the various municipal units will each preserve its identity and independent government, it is proposed to transfer to the Metropolitan City a number of functions. When the proposal was made to unify the administration of all park and recreational facilities and activities under a Metropolitan Park and Recreation Department, the commission undertook a survey of the entire county with respect to parks and recreation. The study was made under the direction of W. C. Batchelor, Superintendent of the Bureau of Recreation of Pittsburgh, and Director of Recreation for the Pittsburgh Board of Education. The following is taken from the report of this study as submitted to the commission.

Purpose

The purpose of this study has been to ascertain the nature, extent, condition of improvement, and method of administration of all parks, playgrounds, athletic fields, swimming pools and other public recreation facilities in Allegheny County.

The attempt has also been made, in the limited time available, to gather sufficient data to serve as a basis for definite suggestions relative to the extent of additional facilities required to provide a reasonably adequate standard of service for the entire population of the county.

Scope

For convenience, a complete park and recreation service has been considered to include four main branches, namely:

I. Major Parks.—Any complete park and recreation service requires as a foundation a major park system, providing within a reasonable distance such facilities as picnic grounds for families and larger organizations; camping sites with swimming, boating and athletic facilities available; zoos; game preserves; botanical and other horticultural developments; golf courses; etc. These services obviously require large acreage.

II. Neighborhood Parks.—These major parks must be supplemented by a larger number of smaller parks located conveniently to the various communities where population is heavy, but need not provide facilities which require parks of large size. Such neighborhood parks would ordinarily include some improved and landscaped areas and as much area as is available left largely in a natural wooded state. Depending upon local needs and other facilities available, these parks would also include, as space permitted, such facilities as tennis courts, childrens' playgrounds, athletic fields, swimming pools, picnic grounds, etc.

III. Athletic Fields.—The great demand by the mass of boys and young men for opportunity to participate in outdoor athletic activity, makes the provision of facilities for the major athletic sports in every thickly populated district an important consideration. Such provision may be cared for to some extent as a part of the development of major parks and neighborhood parks, but will usually require, for adequate service, additional areas set aside solely for this purpose.

IV. Children's Playgrounds.—Last, but by no means of least importance, playgrounds primarily for children of school age must be an integral part of a complete park and recreation plan. The shorter distances which children of this age can be expected to travel, and the increased dangers from traffic where playgrounds are too distant, necessitate a very wide distribution of such areas. However, when full advantage is taken of possible development for this purpose of all existing major parks, neighborhood parks and athletic fields, as well as existing playgrounds on municipal and privately owned property, together with the large number of school grounds adaptable to such use, the provision for a complete service of this nature will be found a much simpler and much less expensive project than would be supposed.

In addition to these four major considerations, a complete park and recreation plan would, of course, include a number of other considerations. For instance: (a) the preservation of the natural beauty of ravines, hillsides and other wooded areas, adjacent to boulevards and elsewhere, often of little commercial value, but which, in the absence of definite consideration, very often become eyesores, tending to become cluttered with cheap commercial enterprises or used as dumps and otherwise contributing toward the depreciation of surrounding property; (b) working out a plan for complete service in facilities for each branch of recreational activity such as swimming, tennis, golf, etc. However, the limited time available has made

Metropolitan Pittsburgh Needs 8,220 Additional Acres of Park and Recreation Space

Considering the regional plan as a whole, this acquisition would be divided among the four main features enumerated in the accompanying report, namely, major parks, neighborhood parks, athletic fields and playgrounds. In view of the existing facilities in these various categories as shown by this study and the additional facilities recommended as necessary to provide a reasonable standard of service in each, the following distribution in the acquisition of this acreage is suggested:

16 playground sites	13 acres
8 athletic field sites	33 acres
22 neighborhood park sites...	220 acres
Major parks, areas incidental to boulevards, etc....	7,964 acres

it impossible to carry this study into such detail as would be required for definite recommendations in these and other similar matters.

Methods and Results

In order to secure reasonably complete information relative to all existing facilities on which to base recommendations for a regional service in these four chief fields, both the questionnaire and personal inspection methods have been used.

In May, 1928, a brief questionnaire was sent to the secretaries of all third-class cities, boroughs and townships in Allegheny County, and a similar questionnaire was sent to the secretaries of all school districts. Two months later, a supplementary questionnaire was sent to all those from whom replies to the first communication had not been received. Following this, a month later, by a personal letter to the few remaining secretaries from whom replies had not been received, it was possible to secure a written statement from each of the 122 governmental units in the county, from either the secretary of the municipality, or the secretary of the school district, or both.

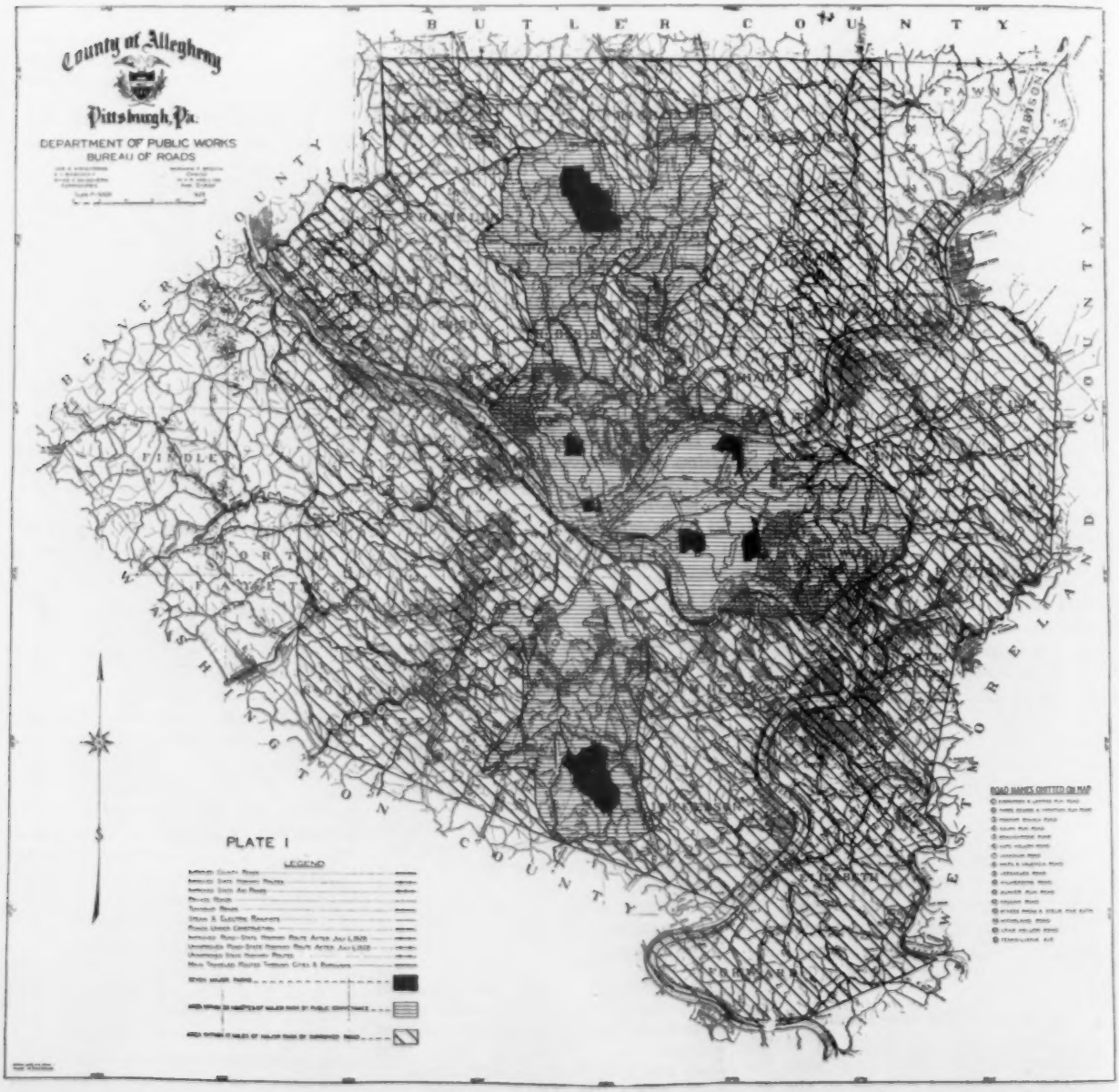
Commencing on December 4, 1928, the earliest date that funds could be made available, an intensive survey through personal inspection was made. The results are here summarized:

SECTION I—MAJOR PARKS

The five larger city parks, namely, Schenley, Highland, Frick, Riverview, and West (North Side Commons) together with the North and South County Parks, have been included in this category. The acreage of these is as follows:

Schenley	437.8
Highland	369.58
Frick	370.
Riverview	240.
West	54.19
North	1,716.23
South	1,558.46
Total acreage	4,746.66

Plotting these parks on a population density map worked out for this purpose, it was found that all of these major parks are admirably located with reference to the



MAJOR PARKS IN ALLEGHENY COUNTY AND THEIR RELATION TO THE DISTRIBUTION OF POPULATION

The seven major parks of the county are indicated by the solid black areas on the map. Those portions closely shaded by horizontal lines are within 30 minutes of a major park by public conveyance, while the diagonally shaded sections are within 15 miles of a major park by an improved road

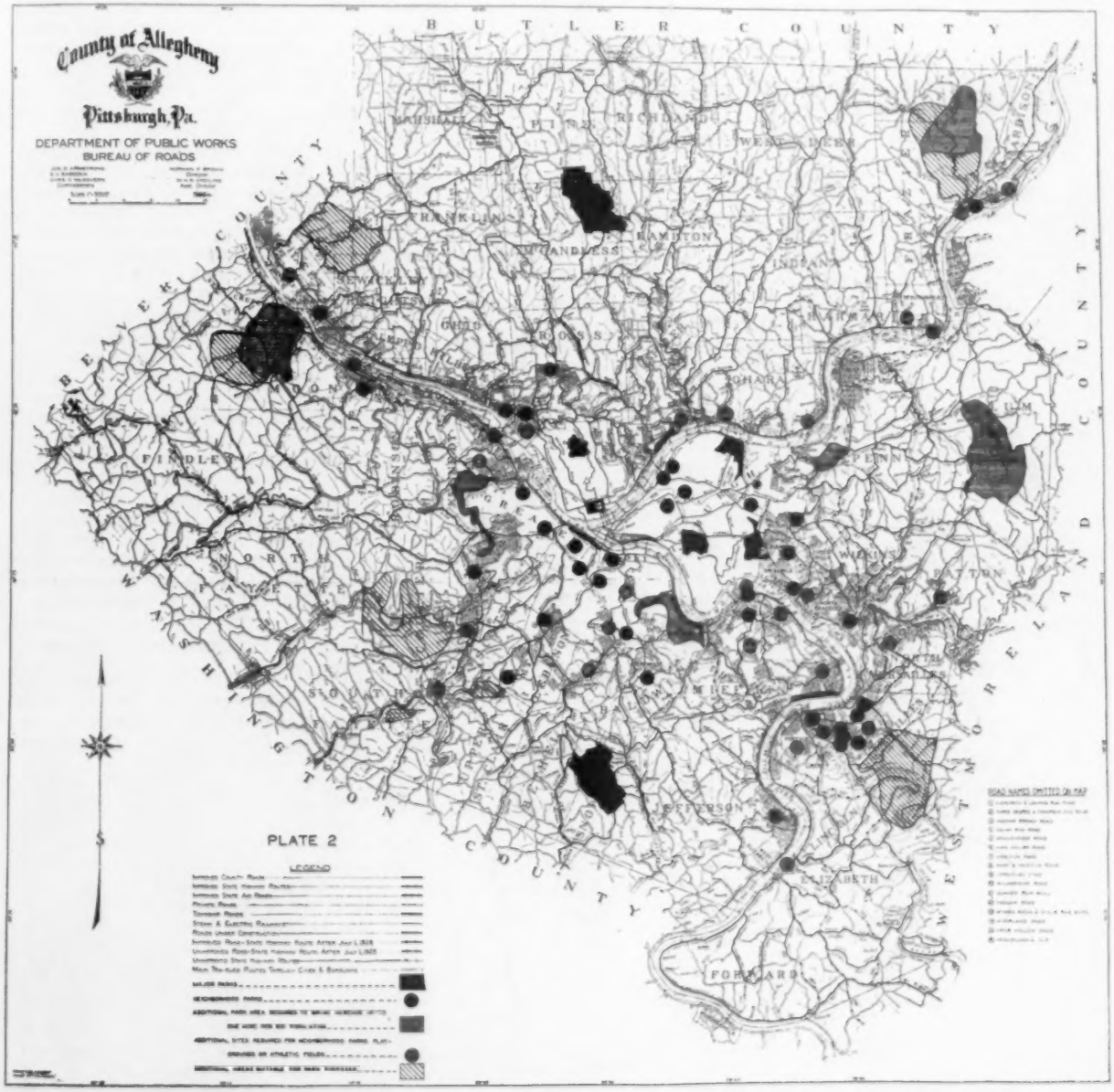
distribution of population in Allegheny County. In order to get an accurate estimate of the proportion of the population of the county living within a thirty-minute ride by public conveyance of a major park, the cooperation of the Bureau of Research of the Pittsburgh Railways Co. was secured and a thirty-minute time-distance area was plotted for each of the seven parks referred to. This includes street-car transportation, for which the average speed (including loading stops) of 9.5 miles per hour was used as a basis; and bus transportation, for which the average speed (including loading stops) of 14 miles per hour was used. The population within 15 miles, by improved roads, of a major park, was also computed.

On Plate I, a composite of these time-distance areas gives a clear picture of the proportion of the county which lies within a 30-minute ride by public conveyance of a major park, and also the larger area of the county which lies within 15 miles, by improved roads, of a major park.

Based on the 1930 population estimates, 764,000 people, or 56.2 per cent of the population of the county, are within a thirty-minute ride of a major park, while an additional 556,000, or 41 per cent of the population, are within 15 miles by improved roads. Thus it is estimated that 97.2 per cent of the population of Allegheny County now lives within a 30-minute radius by public conveyance, or within 15 miles over improved roads by private conveyance, of a major park, leaving only 38,000, or 2.8 per cent of the population, living at a greater distance than this from an existing major park.

A number of eminent authorities on parks and recreation have attempted to work out a definite standard of service on the basis of acreage in proportion to population, or a definite percentage of a given area which should be set aside for park and recreation purposes. The most comprehensive study of this kind has been made by the National Committee on the Study of Municipal and County Parks, an outcome of the National Conference on Outdoor Recreation called by President Coolidge in 1924.* Quoting from the

* This study was made by L. H. Weir of the Playground and Recreation Association of America and financed by the Laura Spellman Rockefeller Memorial Fund.



PRESENT PARKS, REQUIRED ADDITIONS AND REMAINING AVAILABLE AREAS FOR PARKS

The major parks are indicated again by the irregular solid black portions while the neighborhood parks are located by the small solid black circles. The additional area required to bring the acreage up to one acre of parks for every 100 persons is indicated by the closely shaded irregular portions of the maps. The small shaded circles designate additional sites required for neighborhood parks, playgrounds or athletic fields. Other areas suitable for park purposes are outlined by the diagonally shaded portions

report of this committee (Bulletin No. 462, U. S. Bureau of Labor Statistics):

"Although the ratio of park acreage to population has been used as the simplest measure of the extent to which cities provide areas for the recreation of their people, it is by no means an accurate basis for determining this. If most of the total acreage is in one large park, if the parks are poorly distributed, or if they do not provide various types of recreation facilities, the park system may be inefficient even though the acreage is large. The efficiently planned park and recreation system will involve a balanced relationship and well-distributed location of several types of properties, namely, children's playgrounds, neighborhood playfield parks, neighborhood parks, reservations, boulevards, and parkways. Perhaps several types of special properties, such as athletic fields, stadiums, golf courses, botanical gardens, and bathing beaches, will be provided.

"No standard that we have to-day can be taken with any degree of assurance unless we have the particular case well analyzed in the ideal layout for a modern park and recreation system."

In this survey, therefore, particular attention has been given to such matters as proper relationship of various types of facilities, location as related to population distribution, nature of facilities required as determined by kind of district, eg., high- or low-grade residential, semi-industrial, etc., existing facilities privately maintained, and similar considerations. However, as a basis of comparison with other metropolitan districts and regional park developments, an arbitrary ratio of one acre per hundred of population has been used. As is indicated by the following table, a number of the major cities of the United States have a higher acreage ratio, notably Greater New York; Cook County, Ill.; including Chicago; Cuyahoga County, Ohio, including Cleveland; and Denver, Colo.

The figures, given, however, include all park and recreation areas. Therefore, to give Pittsburgh proper credit, there has been added to the major park acreage, the acreage of neighborhood parks and playgrounds in the city of Pittsburgh, as well as those of the other cities, boroughs and townships in the county. This acreage is as follows:

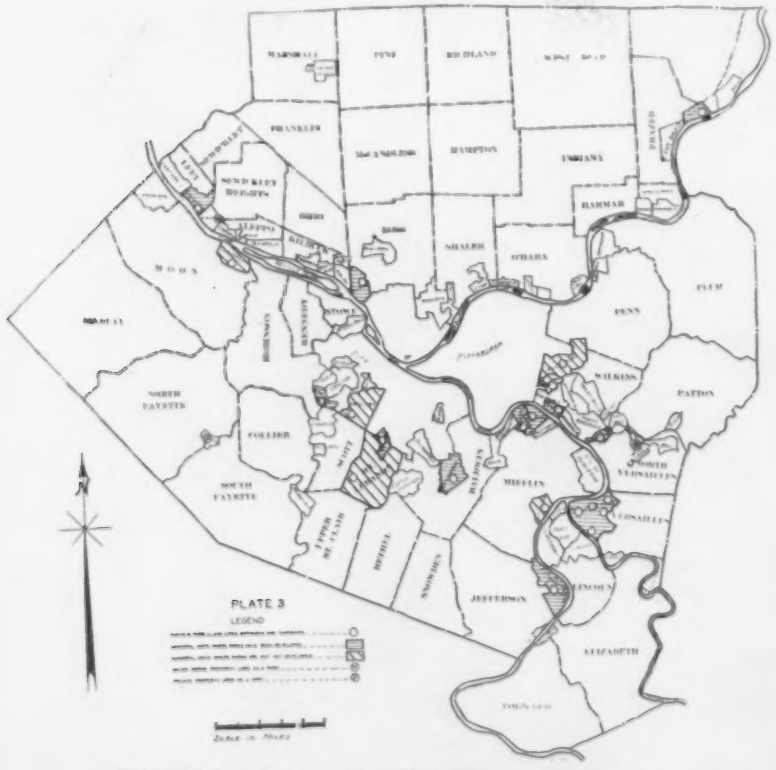
Major parks (city and county)	4,746.66
Pittsburgh neighborhood parks	182.97
Pittsburgh playgrounds	153.36
Third-class city, borough and township parks	295.
Total	5,377.99

It is apparent from these figures that the entire Pittsburgh Metropolitan District (Allegheny County) has at the present time only 42 per cent of the suggested ratio of one acre per hundred of population. In order to reach this minimum for an estimated population for the Pittsburgh Metropolitan District of 1,359,870 in 1930, 13,598 acres of park and recreation property would be required. Deducting from this the 5,377.99 acres of existing park and recreation property in Allegheny County, it would be necessary to acquire an additional 8,220 acres.

On Plate 2, all existing parks are shown in black approximately to scale, and the additional area required to reach the ratio of one acre per hundred inhabitants is shown to scale by shading. The locations of the areas indicated for possible acquisition are, of course, more or les arbitrary, and this is in no way to be considered a definite plan. The attempt has been made, however, on this map to plot as accurately as the limited time available permitted, such areas as are still available for the purposes suggested. The distribution suggested takes into consideration the various factors previously enumerated—population density, nature of facilities required, type of district, school enrollment, etc. A carefully worked-out plan based on adequate study would doubtless show the necessity for many changes. This map does, however, give a comparative view of the relation of existing acreage to the ratio suggested as a minimum.

PARK ACREAGE

City or County	Estimated Population, 1925	City Park Acreage	Acres per 100 Population	County or Metropolitan District Park Acreage	Total Acreage	Acres per 100 Population
New York	5,873,356	10,482	.17	79,519.8	90,001.8	1.53
Chicago	2,993,239	4,487.21	.15			
Cook County (incl. Chicago)	3,376,909			31,600	36,087.21	1.06
Boston	779,620	2,637	.33	10,715	13,352	
Philadelphia	1,993,363	7,801.65	.39			
Cleveland	936,485	2,221.3	.23			
Cuyahoga County (inc. Cleveland)	1,096,530			10,000	12,221.5	1.10
Pittsburgh	631,563	1,808.304	.28			
Allegheny County (inc. Pittsburgh)	1,272,830			3,569.69	5,377.99	.42
Denver	280,911	1,557.37	.55	10,239.14	11,764.87	4.18
Minneapolis	452,435	4,735.58	1.04			



PARK PROPERTIES OUTSIDE THE CITY OF PITTSBURGH

Parks in third-class cities, boroughs and townships are indicated by the plain white circles. Municipal units where parks have been developed are marked by the close horizontal shading, and those where parks are not yet developed, by the wider, diagonally shaded sections. The circles with the letter "w" within show where water-works property is used as a park and those with the letter "p" within mark sites where private property is used as a park

SECTION II—NEIGHBORHOOD PARKS

Two of the third-class cities and nine of the boroughs own park property which may be said to be developed to a point where these municipalities are receiving more or less park service.

One of these parks is 72 acres, and six are of more than 10 acres; however, three range in size only from 1 to 1.5 acres. These latter three are landscaped and add much to the attractiveness of the districts in which they are located, but do not include any of the various types of recreation facilities enumerated under the suggested functions of neighborhood parks. The total area of the 19 improved neighborhood park sites outside the city of Pittsburgh is 184.25 acres. In addition, six boroughs and one township own park property which is still undeveloped and from which these municipalities are not as yet receiving park service, the total being 98.3 acres.

In two boroughs, water-works properties are available to a limited extent as parks. In one borough, park property privately

owned and maintained is available to the public.

The total acreage of all park property in third-class cities, boroughs and townships is 282.55 acres. This does not include 12.45 acres of property the use of which is limited to playgrounds and athletic fields. Plate 3 shows the location of all park properties outside the City of Pittsburgh. Those municipalities with parks which have been developed are shaded horizontally, and those with unimproved parks are shaded diagonally.

This leaves 41 more or less thickly populated communities in the county outside of the city of Pittsburgh without neighborhood park service. However, 19 of these are solely residential communities and are of such nature that park property located at some distance from town would probably be used more than a park in town, since a very large percentage of the population in these communities have automobiles. In view of the growing tendency of those owning automobiles to seek their recreation at some distance, it is possible to provide park service elsewhere much more economically than could be done were the property to be purchased within or adjacent to these communities.

There are, however, 22 heavily populated districts of a more or less industrial nature, some of which are very congested and in which the number owning automobiles is proportionately much smaller than in the former type of community. In these communities, some park service should be provided in the immediate district. The communities included among this number are indicated by shaded circles on Plate 2.

While the twenty-three pieces of park property within the city of Pittsburgh which might be termed neighborhood parks, having a total acreage of 182.97, leave without park service a number of the more congested districts, no attempt has been made in this study to work out a definite plan to provide such service. However, considerable information relative to this matter is available in the office of the Bureau of Recreation of the city of Pittsburgh.

SECTION III—ATHLETIC FIELDS

There are at the present time 101 athletic fields in use in Allegheny County outside the city of Pittsburgh. Only 8 of these, however, are municipally owned, 44 are owned and maintained by school districts, 2 are owned jointly by school district and municipality, and the remaining 47 are on privately owned property.

About 50 per cent of these fields are well developed, being completely graded, regulation-size fields for baseball, football and other sports, with seating facilities for large numbers of spectators, in most instances, fenced and with dressing-rooms and shelter and, in some instances, showers provided. The remaining 50 per cent are sufficiently well graded to be considered first-class fields, but in many instances do not include seating facilities, shelter or dressing-rooms.

These 101 fields provide some athletic field service for every thickly populated district in the county, and it would not seem necessary at this time to provide additional fields to those available. There are some, however, which would need further improvement. Of the 47 private fields, 23 are maintained by industrial or commercial interests for the use of their employees and may be considered reasonably permanent facilities. However, the remaining 24 private fields are used only by consent of the owners and may be diverted to other purposes at any time. In order to insure future service in the matter of athletic fields in these districts, it would be necessary to consider in the near future the proposition of purchase. Plate 4 shows the location of all fields and on it those recommended for purchase are indicated.

In the city of Pittsburgh, there are 53 publicly operated athletic fields. Of these, 28 are well-graded, Class A fields, with seating facilities, in most cases fenced and in some cases with shelter, toilet facilities and showers provided; while 25 are not full regulation size and have no seating or other facilities but in most cases are fenced.

SECTION IV—CHILDREN'S PLAYGROUNDS

Fourteen third-class cities and boroughs own property so located and of such nature as to be suitable for playground sites. Six of these, however, will require further development before being available for use. Thirteen municipalities contribute toward the maintenance and operation of playgrounds. Only two of these, however, bear the entire expense of playground operation.

Five of the thirteen previously mentioned cooperate with the school district in the support of playgrounds. The remaining six cooperate with private agencies.

There are 17 additional municipal units in which playgrounds are maintained without municipal support. In four, playgrounds are maintained by the school district. In two, the school districts cooperate with private agencies. In the remaining 11, playgrounds are supported entirely by private agencies.

To provide playground service for children under the age of 15 in all communities throughout the county where the school enrollment and the population density would warrant, it is estimated that 156 sites would be necessary. Including the sites already in use, 14 playground sites are available on municipally owned property, 102 on property of school districts, and 24 on private property. Of the remaining 16 sites required, a number are more or less available for use, being sufficiently level for play purposes, but the purchase of these grounds would be necessary in order to insure their being permanently available. The total estimated acreage of the 16 sites to be acquired is 13 acres.

The playground map, in view of the large number of sites plotted, is of large scale and does not lend itself to repro-

ATHLETIC FIELDS IN ALLEGHENY COUNTY AND THOSE RECOMMENDED FOR PURCHASE

The municipally owned fields are indicated by a double circle and the letter "m" within. A single circle enclosing the letter "s" shows the fields owned by schools. A double circle with the outer circumference broken at intervals and with the letter "p" within marks the private fields. A circle with a solid black circumference of unusual thickness and the letters "pp" within shows the fields recommended for purchase

duction here. This map indicates the suggested location of all playgrounds required and gives also the agency owning the property as well as the agency maintaining and operating it, where grounds are already in operation. A number of additional sites are available but, since the population density would not warrant their use, these have not been included.

In gathering these data, people connected with all of the 15 independent school districts as well as with the city and county school systems were interviewed and, without exception, there seemed to be a unanimously favorable disposition toward giving the fullest possible cooperation in any plan which would make possible putting into service the large number of school grounds available for play purposes.

There are in the city of Pittsburgh 38 summer playgrounds, 6 of which are operated throughout the year as recreation centers, these being under the Bureau of Recreation. Provision has been made for the operation by the city of 15 additional playgrounds on property of the Board of Education during the coming summer. In addition, the North Side Playground and Vacation School Association operates 3 all-year recreation centers and 20 vacation play schools, the latter on property of the Pittsburgh Board of Education.

General

There are only 4 public swimming pools municipally operated in Allegheny County outside the city of Pittsburgh at the present time. There are a few instances, however, where public school pools are available to the public under certain conditions. In the city of Pittsburgh, however, 31 public swimming pools and river bathing beaches are municipally maintained, operated by the following agencies: Bureau of Recreation, 11; North Side Association, 4; Soho Bath Association, 1; Department of Public Safety (river bathing beaches), 15. In addition, the 21 school swimming pools under the Board of Education of Pittsburgh are available to the public outside of school hours thrughout the year under certain conditions.

Complete data have been gathered on public tennis courts and a considerable amount of additional information relative to privately maintained courts. Similar information has been secured on golf. In the acquisition of additional property in the four categories previously outlined, the provision of complete service in these and other branches of recreational activity should be taken into consideration, but definite recommendations in these matters will require further study.

Summary

In view of the limited time available in making this study, some inaccuracies are inevitable. However, the data gathered form a sufficient basis for certain conclusions and recommendations:

1. It is apparent that a relatively small amount of property has as yet been acquired by the various governmental units in the county aside from the county itself and the city of Pittsburgh for park and recreation purposes, and a still fewer number of these governmental units have provided sufficient appropriations to put this property into service.

2. A very large number of the governmental units have little or no park or recreation facilities, and among this number are many of the most congested districts.

3. The greatest need appears to be in the matter of neighborhood parks and playgrounds, although the major park acreage is only slightly more than one-third of the ratio of one acre per hundred of population which has already been exceeded by Greater New York; Cook County, including Chicago; the Cleveland Metropolitan Park District and others.

4. In the matter of playgrounds, only a very small amount of additional property would be necessary to provide reasonably adequate service in all thickly populated communities throughout the county, but only a very small part of the available play space has as yet been put into service. Equipment, maintenance and supervision are the chief needs here.

5. The existing athletic fields are more nearly adequate than any other type of recreation facility, but a number of these fields will be diverted to other purposes unless acquired in the near future.

6. In a number of instances, municipal boundaries are interfering materially with the full use of available facilities. Adjacent communities, in many instances, could each be more adequately served through closer cooperation with the other or through some agency which would make possible correlating the services of the individual units concerned.

An appendix to the report gives complete tables of the various types of existing facilities, giving location and acreage with notations relative to ownership, extent of improvement, agency maintaining same, etc. Additional areas adaptable for park, playground or athletic purposes are tabulated, and sites recommended for acquisition are indicated.

Many advantages of such a survey are obvious, but chief among these is that of bringing to the attention of the people in general, and those who have the responsibility for the provision of parks and recreation facilities, the varied needs of the entire district, showing in a graphic way how existing facilitise compare with these needs.

Philadelphia Experiments in "Cultural Recreation"

FUNFIELD, one of Philadelphia's recreation centers, is the scene of an interesting experiment in broadening the definition of the word "play." Dances, amateur dramatics, musicals, debates, in addition to the more casual round of indoor and outdoor athletics, have all been promoted there heretofore. The present effort broadens the Funfield programs to include the decoration of the community building there with objects of art, the provision of traveling art exhibits, the institution of art classes and classes in dancing; also, high-grade concerts and good drama as a matter for both active and passive enjoyment.

Instructors have been engaged and have started classes in rhythmic and folk dancing. Monthly chamber music concerts are being offered on Sunday afternoons. Sketching and drawing classes are being discussed.

The Playgrounds Association of the city in conducting this experiment is putting into practice a plan proposed by Samuel S. Fleisher which would make every playground a medium for the dissemination of culture. More than a quarter of a century ago Mr. Fleisher organized the Graphic Sketch Club, which, with his continuous aid, has become a useful educational institution. Several artists of note in music, painting, sculpture, have graduated from it. But the biggest value of this institution—and the score on which it won for Mr. Fleisher the Philadelphia Civic Service Award several years ago, is its power in spreading the spirit of art appreciation. Mr. Fleisher's idea back of the present undertaking is the setting-up of miniature sketch clubs in recreation centers, so that the child in the most impressionable period of its life may have the advantages they offer. If the Funfield experiment succeeds, the Playgrounds Association may carry it to other centers, and it may eventually be taken over as a municipal enterprise.

The general committee, over which Mr. Fleisher presides, is known as the Cultural Recreational Experiment Committee. Subcommittees on music, the drama, dance and pageantry, fine arts, etc., are headed by leaders in their various fields. Charles H. English, Executive Secretary for the Playgrounds Association, who with Mrs. Emily Carmichael, head of the city's Recreation Bureau, acts as advisor to the Committee, says of the experiment:

"If we are to teach children how to play, we ought not to lose sight of the fact that we ought also to teach them how to play when they have passed from childhood. The recreation center can be a place of recreation, of inspiration, of education, to old as well as young. And because all that it does is done in the spirit of play, it can become a part of our educational system without seeming so to be."

Incinerator Knocks Out Garbage Dump in Long Island Town

By CYRIL E. MARSHALL
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SUBURBAN communities on Long Island, N. Y., have grown so rapidly in recent years that the whole territory just outside the limits of Greater New York has reached a point where the disposal of garbage and refuse on public and private dumps is no longer feasible. This is particularly applicable to the communities within the town of Hempstead, so much so that the Town Board has taken a definite stand against dumping garbage and refuse within its jurisdiction, and is establishing sanitary districts with legal powers to cope with the situation.

This situation is being met by many of the incorporated villages by the erection of incinerators, the most recent of which is the municipal plant built by the village of Rockville Centre, which has a population of about 16,000 persons and is collecting and disposing of from sixteen to twenty tons of garbage and refuse per collection day of eight hours.

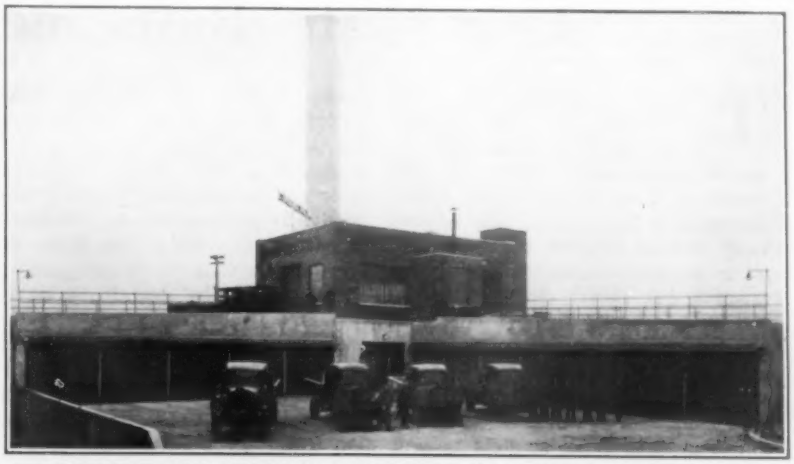
Eight-Hour Day Determined Size of Plant

An incinerator can be most advantageously and economically operated by running the plant during the eight-hour working day, for the reason that the collection of garbage and refuse is made during an eight-hour period of the day and storage capacity must necessarily be limited. The labor cost of operation in excess of eight hours increases over interest and depreciation on the larger plant, so that it is considered good business judgment to build a plant of such capacity that it will not require operation for more than eight hours per day when first completed. With these facts in view and also the additional fact that some of the smaller neighboring communities were anxious to obtain a place for disposal of garbage and refuse, it was decided to build a plant at Rockville Centre with a capacity for burning thirty tons per 8 hours, or approximately twice the present needed capacity for Rockville Centre alone.

Contracts were made with the villages of East Rockaway and Malverne for the disposing of their garbage and refuse, which added ten to twelve tons per day to be burned, thus making it possible for the thirty-ton plant to be operated at its full capacity for the full eight-hour period. As the amount of garbage and refuse increases over the eight-hour capacity of the plant, operation can be conducted over a longer period up to the full twenty-four hours of the day.

Incinerator in Residential Community

A properly designed incinerator is not a nuisance to the surrounding property if properly operated, and may be placed with the higher class manufacturing or public utilities plants. However, it is essential that it be of a type that will properly destroy the gases by means of high temperatures in the combustion chambers, thus eliminating both smoke and odor. A residential community such as Rockville Centre demands that only the best scientific methods be applied to the burning process, and for this reason only the high-temperature plants were considered.



THE NEW INCINERATOR AT ROCKVILLE CENTRE, N. Y., SHOWING THE PAVED PLATFORM BETWEEN THE TWO GARAGE UNITS BUILT UNDER THE APPROACH RAMPS

The incinerator was built on about two acres of low ground at the extreme western boundary of the village, only a few hundred feet distant from residences and bordering on the new state-built "Sunrise Highway." The charging floor was placed at about 7 feet above the grade of the highway, and the stoking floor about 8 feet below the highway at about the natural ground level, thus providing an opportunity for disposing of residue from the furnaces by hoisting and dumping at the charging-floor level and gradually filling up to that level, thus reclaiming low ground in the vicinity of the incinerator.

The Building

The building is approximately 40 x 50 feet and 32 feet high. The foundations and walls up to the level of the charging floor are built of reinforced concrete with a superstructure of brick. The building has two entrances to the charging floor, one on the west side which receives the garbage and refuse from the northerly section of the village over a driveway from the Sunrise Highway, and the other entrance on the south for the southerly section of the village. This arrangement allows for the shortest haul by the trucks and also makes it possible to dump garbage on the portion of the floor where needed, thus preventing blocking-up the entrances, which may happen if only one entrance is provided and several trucks arrive within a short period.

Handling Garbage in Plant

The incinerator is a United States Standard Destructor, installed by the Pittsburgh-Des Moines Steel Co., consisting of two separate units each having a capacity for destroying 2 tons of garbage and refuse per hour.

In this type of furnace the raw garbage and refuse is dropped through charging hoppers upon side or drying grates, where it ignites and the burning process starts. The burning matter is then sliced by the stoker on to the center grates, where the main burning takes place. The gases thus developed from burning the garbage pass from the furnace into a combustion chamber, where the gases are retarded and sufficiently high temperatures are developed to break down the gases and

change their chemical composition. The broken-down gases then pass into a radial brick chimney, the top of which is about 100 feet above the floor of the combustion chamber, and are passed off into the air without smoke or objectionable odor. Each burning unit has its own separate combustion chamber and flue leading to this chimney.

The chimney is fire-brick lined to its full height, and the walls of the furnace and combustion chamber are insulated to withstand the high temperatures developed.

Garages for Collection Trucks

Garages were constructed to take care of the housing of twelve garbage and street department trucks and equipment, and were placed on adjacent sides of the building so that the whole structure appears L-shaped. The garages were constructed of reinforced concrete and are so arranged that the roofs of the garages form part of the ramps leading to the charging floor of the incinerator.

The ramps or roadways to the incinerator are built of reinforced concrete with a driving width of 10 feet, with monolithic curbing on either side. The approach roadways are built over earth fill to the garages, and then over the roof of the garages to the charging floor of the plant.

The west roadway has a branch road forming a Y which leads down to the courtyard in front of the garages. This court is approximately 75 feet square and is paved with reinforced concrete and so graded that water drains away from the garages to the center of the court, where a catch-basin is installed. The catch-basin is connected to a 12-inch drain which empties into a nearby creek. All roof water, furnace cooling water, and wash water from the charging and stoking floors of the plant is piped into this drain. The courtyard so drained also affords an excellent place for washing the trucks at the end of each day, keeping them sanitary and free from garbage and refuse.

Cost

The cost of construction of the incinerator plant complete, including garages, roadways, fees, etc. (not including cost of land), was approximately $107,000. The plant has been in operation for seven months, without any complaints or objections from the people of the village, and has received commendation by a great number of officials of other villages and cities.

What Control Do State Commissions Have Over Water Rates and Service?

THE general movement for state regulation of public utilities, which has been in progress for two decades, while directed chiefly to the control of those utilities where private ownership is the rule, has also affected water systems for cities, along with the other standard urban utilities—street railways, gas, electric light and power, and the telephone. Due presumably to the greater proportion of public ownership in the case of water systems, amounting to about 70 per cent of the total number of systems, the extent of state regulation is not as great as with some other urban utilities, and much less than with railroads. Delaware is the only state without a commission having regulatory powers over railroads, and there are very few other states that do not have commission regulation of at least some of the utilities previously mentioned. The following compilation, prepared in collaboration with the various state authorities, shows only 29 states that have granted to commissions a full degree of jurisdiction over water companies, and only 5 where municipally owned systems are under a similar degree of state control. There are 7 states where there is a limited amount of commission jurisdiction over privately owned water systems, 3 of which states, together with 5 others, exercise a limited control over municipally owned systems. This leaves a group of 12 states where no commission regulation of water companies is in effect, and a group of 35 where there is no such regulation of municipally owned systems. The District of Columbia is not included in any of these figures, as it is served by a single system, publicly owned. In some of the states the question of state control over water companies is largely or wholly academic, on account of municipal ownership being practically universal therein. Delaware, in particular, although the legal residence of numerous water companies, is served entirely by municipally owned systems.

The regulatory commissions are known by various names—Public Utilities Commission, Public Service Commission, Railroad Commission, Corporation Commission, Department of Public Utilities, etc.

The difference in policies as to state control of water systems is well illustrated by Massachusetts, New York and Wisconsin, the states with the longest experience in commission regulation. Massachusetts regulates the private companies but not the municipally owned systems; in New York the commission regulates neither; while in Wisconsin a considerable degree of jurisdiction is given the commission, for both types.

The matters as to which the state exercises control may include rates, service, extensions, accounting, security issues, and certificates or permits to operate, to mention the chief items. In some instances certain of these subjects are specifically reserved to the cities; and, of course, the same division of opinion as to the desirability of state regulation exists in connection with water systems as with other utilities, many city authorities strongly preferring local control over water companies as well as over city-owned systems.

A special factor in regard to regulation of water systems is that of public health. This has not been taken into account in the compilation herewith, but will be dealt with in a later issue.

ALABAMA.—The Alabama Public Service Commission, at Montgomery, regulates rates, service etc., of privately owned and operated water companies, but does not have jurisdiction over municipally owned utilities.

ARIZONA.—The Arizona Corporation Commission, at Phoenix, has regulatory jurisdiction over privately owned water utilities but not over those municipally owned.

ARKANSAS.—The municipal councils or city commissions of municipalities in Arkansas are vested with regulatory jurisdiction, within the municipal limits, over water systems, whether privately or publicly owned. The Railroad Commission, at Little Rock, has jurisdiction over water companies outside municipal limits, and has the duty to require utility companies to continue to furnish service to municipalities.

CALIFORNIA.—The Railroad Commission of the State of California, at San Francisco, has regulatory jurisdiction over privately owned water utilities. It has no jurisdiction over systems operated by municipalities or certain quasi-political subdivisions of the state, nor over mutual companies delivering water to no one but stockholders or members at cost.

COLORADO.—The Public Utilities Commission of the State of Colorado, at Denver, has jurisdiction over all private water companies, and any operations of municipally owned and operated water plants outside the municipality.

CONNECTICUT.—The Connecticut Public Utilities Commission, at Hartford, has

jurisdiction over all privately owned water utilities. This jurisdiction does not apply, however, to municipally owned utilities except insofar as to require that such utilities file with the Commission an annual report showing financial and operating conditions.

DELAWARE.—There is no state utility commission in Delaware, nor does the state have any control over water companies or municipal water departments. Regulation of these is left to the cities concerned.

FLORIDA.—There is no state commission having jurisdiction over water companies or municipal water departments, regulation of these being left with the cities concerned.

GEORGIA.—There is no state commission having jurisdiction over water companies or municipal water departments, regulation of these being left with the cities concerned.

IDAHO.—The Idaho Public Utilities Commission, at Boise, has jurisdiction over privately operated water systems, but not over municipally owned or mutual companies.

ILLINOIS.—The Illinois Commerce Commission, at Springfield, has jurisdiction over privately owned water utilities in the regulation of rates, service and the issuing of stocks and bonds within the state. The Commission has no jurisdiction over municipally owned systems.

INDIANA.—The Public Service Commission of Indiana, at Indianapolis, has regulatory jurisdiction over all water utilities, privately or publicly owned; but no such utility may charge rates in excess of those fixed in any franchise in effect at the time of the establishment of the Public Service Commission. Municipal councils have power over service and extensions.

IOWA.—There is no state commission having jurisdiction over water companies or municipal water departments, regulation of these being left with the cities concerned.

KANSAS.—The Kansas Public Service Commission, at Topeka, has jurisdiction over water companies serving more than one city. It has no jurisdiction over municipally owned systems.

KENTUCKY.—There is no state commission having jurisdiction over water companies or municipal water departments, regulation of these being left with the cities concerned.

LOUISIANA.—The Louisiana Public Service Commission, at Baton Rouge, has regulatory jurisdiction over water utilities, privately or publicly owned, in any city where such jurisdiction has been accepted by a majority of the electors voting on the question.

MAINE.—The Maine Public Utilities Commission, at Augusta, has regulatory jurisdiction over water utilities, whether privately or publicly owned.

MARYLAND.—The Maryland Public Service Commission, at Baltimore, has regulatory jurisdiction over privately owned water utilities but not over those municipally owned.

MASSACHUSETTS.—The Massachusetts Department of Public Utilities, at Boston, has regulatory jurisdiction over privately owned water utilities but not over those municipally owned.

MICHIGAN.—The Michigan Public Utilities Commission, at Lansing, has no jurisdiction over either privately or municipally owned water utilities except in the matter of the incorporation of capital stock and securities of corporations.

MINNESOTA.—There is no state commission having jurisdiction over water companies or municipal water departments, regulation of these being left with the cities concerned.

MISSISSIPPI.—There is no state commission having jurisdiction over water companies or municipal water departments, regulation of these being left with the cities concerned.

MISSOURI.—The Missouri Public Service Commission, at Jefferson City, has regulatory jurisdiction over privately owned water utilities, but not over those municipally owned.

MONTANA.—The Public Service Commission of Montana, at Helena, has regulatory jurisdiction over water utilities, whether privately or publicly owned.

NEBRASKA.—The Nebraska State Railway Commission, at Lincoln, supervises the issuance of securities of privately-owned water utilities, but has no other jurisdiction over water utilities, whether privately or publicly owned.

NEVADA.—The Nevada Public Service Commission, at Carson City, has full regulatory jurisdiction over both privately and publicly owned water utilities.

NEW HAMPSHIRE.—The New Hampshire Public Service Commission, at Concord, has regulatory jurisdiction over privately owned water utilities serving ten or more consumers, but not over municipally owned or operated utilities.

NEW JERSEY.—The New Jersey Board of Public Utility Commissioners, at Trenton, has regulatory jurisdiction over privately owned water utilities. It does not have jurisdiction with respect to municipal water departments, except to require municipalities operating such departments to keep uniform systems of accounting and to make annual reports thereof to the Board.

NEW MEXICO.—The New Mexico State Corporation Commission, at Santa Fe, has no control over water companies or municipal water departments, except as these may possibly come under the term "transmission companies." This point has never been tested out, however.

NEW YORK.—There is no state commission having jurisdiction over water companies or municipal water departments, regulation of these being left with the cities concerned.

NORTH CAROLINA.—The North Carolina Corporation Commission, at Raleigh, has regulatory jurisdiction over privately owned water companies, but not over municipally owned water utilities, which constitute practically all the water utilities in the state.

NORTH DAKOTA.—The North Dakota Board of Railroad Commissions, at Bismarck, has regulatory jurisdiction over privately owned water utilities, but not over those that are municipally owned There is only one private water company in the state.

OHIO.—The Public Utilities Commission of Ohio, at Columbus, has jurisdiction over privately owned water companies, but not over municipally owned utilities.

OKLAHOMA.—The Oklahoma Corporation Commission, at Oklahoma City, has regulatory jurisdiction over privately owned water utilities, but not over those municipally owned.

OREGON.—The Public Service Commission of Oregon, at Salem, has jurisdiction over privately owned water utilities, but does not have jurisdiction over water plants or systems owned or controlled by municipalities.

PENNSYLVANIA.—The Public Service Commission of the Commonwealth of Pennsylvania, at Harrisburg, has control over the rates, services, facilities and accounts of privately owned water utilities, but its jurisdiction over municipally owned water utilities extends only to matters of accounting and reporting.

RHODE ISLAND.—There is no state commission having jurisdiction over water companies or municipal water departments, regulation of these being left with the cities concerned.

SOUTH CAROLINA.—The Railroad Commission of South Carolina has jurisdiction over companies but not over municipal departments. Nearly all water-supply is municipally owned.

SOUTH DAKOTA.—There is no state commission having jurisdiction over water companies or municipal water departments, regulation of these being left with the cities concerned.

TENNESSEE.—The Tennessee Railroad and Public Utilities Commission, at Nashville, has regulatory jurisdiction over privately owned water utilities, but not over those that are municipally owned.

TEXAS.—There is no state commission having jurisdiction over water companies or municipal water departments, regulation of these being left with the cities concerned.

UTAH.—The Utah Public Utilities Commission, at Salt Lake City, has regulatory jurisdiction over privately owned water utilities, but not over those municipally owned.

VERMONT.—The Vermont Public Service Commission, at Montpelier, has regulatory jurisdiction over privately owned water utilities, but not over those municipally owned.

VIRGINIA.—The Virginia State Corporation Commission, at Richmond, has regulatory jurisdiction over privately owned water utilities, but not over those municipally owned.

WASHINGTON.—The Washington Department of Public Works, at Olympia, has regulatory jurisdiction over privately owned water utilities, but not over those municipally owned, except as to extensions beyond corporate limits.

WEST VIRGINIA.—The Public Service

Commission of West Virginia, at Charleston, has regulatory jurisdiction over all water utilities, whether privately or publicly owned.

WISCONSIN.—The Railroad Commission of Wisconsin, at Madison, has regulatory jurisdiction over water utilities, whether privately or publicly owned. Municipal councils have control of service and extensions, subject to review by the Commission.

WYOMING.—The Wyoming Public Service Commission, at Cheyenne, has regulatory jurisdiction over all water utilities, whether privately or municipally owned.

Reconditioning of Concrete Pavements with Bituminous Materials

By ALEX. W. MUIR

SUPERINTENDENT OF MAINTENANCE, NEW JERSEY STATE HIGHWAY COMMISSION

THE need for patching concrete pavements may arise through openings made for the purpose of obtaining acess to subsurface structures, from the total failure of the whole or a portion of a slab, or because of a failure in the surface alone. Whatever the cause, the general method of handling the repair with bituminous materials is the same, although there may be necessary variations in the type of materials to be used. Unless some further bituminous material is to be used, the use of bituminous patching is, for the most part, justified only as a temporary expedient. Particularly during the winter months, climatic conditions in many portions of the country make it almost impossible to do concrete work. Under these circumstances, the use of a bituminous patch becomes almost a necessity. On extremely heavily traveled roads, patching with bituminous materials may be done with only such interference with traffic as is necessary for the completion of the work, whereas, if concrete is used, the curing period must ensue before traffic can again use the repaired portion.

Method of Making Patches

The method of making bituminous patches in concrete roads may cover almost the whole range of the use of bituminous materials. Crushed stone, clean screened gravel, crushed slag and sand have all been used and have their advocates. Crushed stone is probably the most satisfactory mineral aggregate. There may be certain cases where very thin patches are to be placed, where a sand mixture will give very satisfactory results. In considering the size of the mineral aggregate to be used, due consideration should be given to the nature of the patch to be made. If it is necessary to make a deep patch, the body of the material should be of a size not smaller than that generally known as inch-and-one-half stone. In some cases, it may be found desirable to use even a larger size aggregate. In general, it may be said that the larger the aggregate, the more stable the patch. Where the larger size aggregate is used, proper waterproofing of the surface must always be provided by the use of a fine aggregate surface seal coat. This fine aggregate seal coat should have only sufficient thickness to properly seal the surface and present a neat appearance and smooth riding surface.

Cold Patch

Perhaps the most commonly used method is the cold patching method. The ordinary asphalt emulsion cannot be used during freezing weather. Either the cut-back tar or the cut-back asphalt may be used at any time of the year, and one of these two materials is probably much more generally used than is the asphalt emulsion. When climatic conditions permit, the asphalt emulsion will, in general, be found to be more satisfactory, because there is less likelihood of producing an unstable patch, and also because the material requires no curing period after preparation before its use. In the case of both the cut-back tar and the asphalt, the mixture should always be cured for at least twenty-four hours before use, in order to permit the escape of the volatile solvents. Unless this practice is followed, a soft and unstable patch is almost sure to ensue. This is particularly true where the depth of patch is considerable, and the consequent opportunity for the escape of the solvent is thereby greatly reduced.

Hot Patch

Another method is that commonly known as the hot patching method. In this method, the grade of bitumen most commonly is that ordinarily used in bituminous penetration work. The bitumen may be either a tar or an asphalt. There are some who prefer to use bitumen of a harder consistency. This is particularly true where asphalt is the bituminous material used. There are two possible variations of this method; the first where the bitumen is actually mixed with the mineral aggregate and then placed, and the other where the mineral aggregate is first placed in the hole to be patched and the bitumen applied by the penetration method. The mixing method is very much to be preferred, for the reason that, except in very large operations, the application of the bitumen, under the penetration method, must be made either from hand pouring pots or by the use of a small portable distributor. The result is that the application of bitumen is inaccurately and improperly done. If the materials are mixed before placing, however, it is possible to measure both the bitumen and the mineral aggregate fairly accurately and secure definite and satisfactory proportions This method has, of course, the disadvantage that it requires rather more equipment, and, particularly in cold weather, necessitates heating of the mineral aggregates. On the other hand, it has the advantage that it is not necessary to cure the mixture before placing, and if a proper consistency of bitumen is used, there is little likelihood of an unstable patch.

Other Cold Patching Materials

The use of a natural bituminous mixture or cold mixed bituminous concrete constitutes another method which has been used to some extent with considerable success. Examples of these materials are the natural rock asphalt, mined in Kentucky, or Amiesite, which is familiar to many of the Eastern States. Natural rock asphalts are particularly suitable for making thin surface patches, because the mineral aggregate therein is very fine. They have, furthermore, the advantages that they are easily stored, show very little deterioration while in storage, even over long periods of time, and are easily handled. Rock asphalts, however, occur at only a few points in the United States, with the result that, except for that immediate territory, a long freight haul is involved in the delivery of the material to the point of use. In the case of Amesite, several of the Eastern States have relatively close sources of supply. This material stores well for a limited period, can be obtained in several gradings and at a relatively moderate cost. The material gives excellent results when properly handled and placed.

Patching with Sheet Asphalt

The last patching method of which we

have knowledge is that wherein hot bituminous mixtures are used. This is, for the most part, available only in the vicinity of permanent or semi-permanent asphalt plants. It has the disadvantage that much more equipment is involved in the placing of a patch; the material can be used only under satisfactory weather conditions, and the cost will be generally higher than through the use of any of the other patching methods. It has the advantage that where any considerable area is involved, it is highly probable that a more permanent and satisfactory surface will be obtained.

This method has been used in New Jersey on a long approach to one of the larger bridges. This approach is over a stretch of tidal meadows and the pavement is laid on a new embankment. It was considered advisable to place a permanent pavement, with permanent curbs, and certain subsurface structures under the sidewalk area immediately back of the curb. There is a very considerable progressive unequal settlement over one portion of this approach, with consequent settlement and tipping of the slabs. The conditions are such as to make it almost impossible to satisfactorily bring the slabs back into place, and it seems inadvisable to attempt to do so until the settlement is complete. In order to correct this condition, the curbs have been jacked up into their proper position, the inequalities in the pavement have been taken out with the use of a modified black base mixture, and a suitable riding surface provided by the use of a thin surface layer of sheet asphalt mixture. The result is that this stretch of highway has given a satisfactory surface for the heavy volume and tonnage of traffic using it. The extent of this work has brought it almost into the class of a bituminous resurfacing. This phase of the matter has, however, developed as a result of the necessity for taking out inequalities in the surface rather than as a primary consideration.

Surface Treatment

The first step in the surface treatment of a concrete road is the repair of any broken-down or disintegrated areas. Areas which are badly disintegrated may be removed and patched with concrete. As a general proposition bituminous patching, with one of the types heretofore described, is the method most frequently adopted. Patching should be done sufficiently in advance of the application of the surface treatment to permit the patches to become thoroughly consolidated and thoroughly cured, if a cut-back bitumen has been used in making the patch. The greatest care should be taken that the patches are so placed as to preserve the proper grade and transverse contour of the pavement. The pavement should be thoroughly swept and freed from all foreign material which would interfere with proper adherence of the bitumen to the pavement.

In considering the nature of the bitumen to be applied, experience seems to indicate that one of the various grades of tar is mostly likely to prove satisfactory. Some little work has been done with asphalt, but, so far as we are able to determine, with rather indifferent results. There is a difference of opinion as to the grade or grades of tar to be used. Some quite successful work has been done with the use of a cold tar of a grade comparable to Tarvia B. There are advocates of the use of a two-course treatment; the first application to consist of a light tar, which is used as a priming coat. This light tar is of a considerably lighter consistency than Tarvia B. Following this priming coat, a treatment of a considerably heavier grade of tar is applied. The method most generally used and advocated is that wherein a tar comparable to Tarvia A is applied in a single treatment. Approximately ¼-gallon of bitumen per square yard should be used. The bitumen should be applied as hot as is permissible with this grade of material. The pavement should be thoroughly dry and, if possible, the application should be made during hot summer weather, so that there will be a minimum differential in temperature between the bitumen and the pavement. The covering material should be spread as rapidly as possible behind the application and thoroughly rolled into place. The use of sand as a cover is not advised as our observation indicates that it tends to form a soft, unstable mat. Considerable quantities of slag chips have also been used with quite marked success. Slag is objected to by many as so soft as to pulverize under rolling and traffic. Where slags of suitable quality are available, however, excellent results will be obtained, and at a considerable reduction in cost. Some very acceptable work has also been done with fine gravel as a cover. The most widely used, and probably the most acceptable material, although at the same time probably the most expensive, is a ½-inch stone chip. Particularly where trap-rock is available, excellent wearing qualities are provided and there is relatively little pulverizing under the roller.

Maintenance

After the treatment has been applied, it is of the greatest importance that it be carefully patrolled and any imperfections in the surface promptly repaired. In making these repairs, the utmost care must be taken to insure a patch which will present a surface uniform with the rest of the treatment. The treatment seems to be to obtain a patch which has a greater thickness than the original treatment, with the result that a bad appearance is created and a bad bump formed in the pavement. Is the bump more important than the appearance? Yes, because the necessity for the surface treatment arose because of some weakness in the pavement. The creation of bumps results in subjecting the pavement to additional impact stresses, which its very condition indicates it is ill able to withstand, and the very end sought, namely, the protection and preservation of the pavement is therefore in a measure defeated.

It will be necessary to follow up the surface treatment, at suitable intervals, with additional treatments. It is at this stage of the work that the utmost care must be used. The treatment must be repeated soon enough to preserve proper life in the bitumen. On the other hand the treatments must not follow each other so rapidly as to build up a soft, unstable mat.

If surface treatment work is carefully done, pavements which seem almost hopeless can, with a relatively small expenditure, be preserved and will give satisfactory service for a considerable length of time.

The Problem

Nearly every highway organization that has been building concrete roads for any length of time is faced with the necessity of bringing back into serviceable condition concrete roads that were built during the infancy of the concrete pavement. Regardless of the causes of the condition of these pavements, the problem which confronts the highway authorities is that of restoring the pavement to an acceptable condition at a reasonable expenditure, and at the same time, in many cases, without taking the road out of service. Patching or resurfacing with concrete may, in many cases, be possible or even advisable. On the other hand, there will probably be many cases where the use of bituminous materials will be found far cheaper, and it is entirely possible that the work may be done with far less interference with the traffic using the highway.

A. W. M.

Thin Bituminous Resurfacing

The first two portions of this discussion have covered a field wherein the concrete pavement still preserves its identity as such. The remainder is devoted to a condition where there may reasonably be a question as to whether the concrete pavement still remains a surface type pavement, or whether it has lost its identity and should be considered only as a base. Where the resurfacing applied is only sufficient in depth to provide a protective coating, the pavement should still be considered a concrete pavement. Where it approaches or actually assumes the depth of a standard bituminous pavement, the concrete pavement has then lost its identity and become a base.

Where natural rock asphalt is available at a reasonable cost, it seems to be a highly suitable material for light resurfacing. The material seems to give satisfactory results when used in thicknesses very materially less than the average thickness of a bituminous surface. The promoters of this material advocate its use in a thickness of not to exceed 1½ inches loose. This gives a compacted thickness of approximately 1 inch. Experience with the use of this material in thin resurfacing on other types of pavement would seem to indicate that it is highly probable that satisfactory results will be obtained, providing care is exercised in obtaining material with suitable characteristics and properly prepared.

Considerable quantities of work have been done with the use of special fine-mix Amiesite and fine hot-mix bituminous concrete. Results in Connecticut, seem to indicate that the maximum size of aggregate in such mixes should not exceed one-half the depth of the surface applied. One small job in New Jersey was surfaced with a special fine mix bituminous concrete, the depth of surfacing thereon averaging ½-inch. This surface at first appeared to give very satisfactory results, but it started to disintegrate in approximately three years, so that it was finally necessary to remove the material and replace it with a thicker surfacing. The general trend of experience would seem to indicate that surfaces as thin as ½-inch are not economically sound and that the probable minimum economic depth for pavements of this type is about 1½ inches. Surface course sheet asphalt has also been used with apparently satisfactory results in a depth of approximately 1½ inches. Our observation of single-course sheet asphalt pavements leads us, however, to be somewhat skeptical of the final results with the use of such surfaces.

Asphalt Block Surfacing

A thin resurfacing intermediate between the natural rock asphalt and the 1½-inch bituminous pavements consists of a specially designed thin asphalt block pavement, which has been used to a limited extent. Instead of the normal thickness of 2 inches, the block is made with a 1¼-inch thickness. In addition to the reduction in thickness, the normal 5 by 12-inch block is reduced to 8 by 4 inches. Reports received in connection with this material, some of which has been in use for as long as five years, indicate very satisfactory results.

Results would seem to indicate that the use of a surface sufficiently thin to be considered as merely a protective coating is probably not economically sound, and that where bituminous resurfacing is to be done, the surface to be applied must approach very nearly to the thickness of a standard bituminous pavement. Satisfactory results may be obtained, however, at a considerable reduction in cost, as compared to the use of a standard bituminous pavement.

Resurfacing with Standard Type Bituminous Pavements

When, after investigation, it has been determined that a surface type concrete pavement should be resurfaced with a standard type bituminous pavement, the concrete pavement should then be carefully gone over and all badly broken-up areas removed and replaced with concrete, in order that a uniform base may be provided for the bituminous surface. An alternate procedure frequently recommended is the use of a black base in such areas. We very much prefer patching with concrete particularly where small areas must be removed, as it is extremely difficult to secure proper consolidation of the black base. Unless proper consolidation is secured, a depression is almost sure to develop in the surface.

Many engineers have made much ado over the difficulties presented by the smoothness of the surface type concrete when a suggestion is made to resurface it with a bituminous pavement. There are certain engineers, however, who specify a finish on a concrete base practically equal to the finish on a surface type concrete pavement. There are certain concrete pavements laid with the definite idea of using them as such for a term of years and then resurfacing them with standard bituminous pavements. The success of the bituminous pavements in both cases indicates to us that the fears with respect to smoothness are not well founded. Our experience with bituminous pavements indicates that pushing and rolling of the surface are more functions of the bituminous mix than of the nature of the surface of the base. The primary consideration would therefore seem to be the necessity or desirability of using a standard type bituminous pavement, and, that fact having been determined, the drawing of a specification which will produce a pavement of proper stability. The specification in this case in reality differs in no wise from that which should be used under any conditions where standard bituminous pavements are used. The characteristics and specifications of bituminous pavements are too well known for it to be necessary for us to go into them at this time. The use of one of the bituminous concretes, rather than sheet asphalt, is largely a matter of opinion, although the probability is that a 3-inch sheet asphalt pavement will cost slightly more than a 2-inch bituminous concrete.

Where a concrete pavement can be placed in satisfactory condition to serve as a base, the experience of many authorities indicates that its resurfacing with a bituminous pavement is economically sound and will furnish a pavement which will give eminently satisfactory service over a considerable term of years.

ACKNOWLEDGMENT.—From a paper presented at the Fifth Annual Convention of the Highway Officials of the North Atlantic States.

A Wealth of Water-Supply Information

The Water-Supply Statistics of American Municipalities published as Section 9 in the 1929 MUNICIPAL INDEX is a veritable mine of valuable information on water-works of 4,300 cities in the United States. The information has been so chosen that comparisons may be made between one supply and another by any one conversant with water-works procedure. The original reports furnished by water-works officials from which these statistics were prepared also contain additional valuable information which is now being summarized as a series of special reports which will be published from month to month in THE AMERICAN CITY over an extended period. The first reports appear on page 155 of this issue.

New Government Buildings Will Add to the Beauty of Washington

PLANS for the beautification of Washington, discussed 25 years ago when Theodore Roosevelt was President, are now well on the way to realization with the approval and active support of President Hoover.

The extensive building program which the Government is undertaking as the outstanding feature of this movement was outlined by the President; Secretary Mellon; Senator Smoot, Chairman of the Public Buildings Commission; Representative Elliott, Chairman of the House Committee on Public Buildings and Grounds; and Milton B. Medary, member of the National Park and Planning Commission, at the 1929 Convention, in Washington, of the American Institute of Architects. An exhibit of the models of the new buildings was inspected at that gathering and thrown open to the public for the first time. These models will be on view for visitors in the main building of the Treasury Department.

Triangle Area Most Extensive Development

Congress has already authorized $75,000,000 for public buildings in the District of Columbia, Senator Smoot announced. Of this total, $50,000,000 will be used for the actual construction of buildings and $25,000,000 for the acquisition of land on which these buildings are to be erected. Most of this latter sum will be spent in acquiring land in the so-called Triangle Area, extending along Pennsylvania Avenue from 15th Street to the Capitol, and bounded on the south side by the Mall. A site has already been purchased for the Supreme Court Building, facing the Capitol, extending along East Capitol Street and covering an area approximating that of the Congressional Library on the south side of the street.

There are 23 city blocks involved in the building program, and of this number, four have been purchased, nine are now in process of condemnation, and condemnation proceedings will be started for six more within the next month, it was announced. Thus only four blocks remain to be appropriated for and it is expected that soon after the next regular session of Congress, funds will be voted for the purchase of the remaining property.

MODELS OF THE NEW GOVERNMENT BUILDINGS FOR WASHINGTON
Secretary of the Treasury Andrew W. Mellon standing beside the exhibit of models recently opened for public inspection. A general idea of how the Triangle Area is to be developed can be gained from this view

A CLOSER VIEW OF SOME OF THE MODELS OF THE PROPOSED STRUCTURES
How one side of the Triangle Area will appear when looking east toward the Capitol. This area extends along Pennsylvania Avenue from Fifteenth Street to the Capitol and is bounded on the south side by the Mall

Some of the building enterprises are already under way. An Adminstration Building, connecting the two existing wings of the Department of Agriculture, is being constructed at a cost of $2,000,000. This department will also have another building to be constructed soon on the south side of the Administration Building. The latter structure will house a number of laboratories and activities now located in other structures.

Department of Commerce Building Largest

An extension to the Government Printing Office is to be made at a cost

of $1,250,000. An attractive building for the Bureau of Internal Revenue is being built under a $10,000,000 expenditure. This structure will be part of the Triangle development and cover the area bounded by 10th, 12th, B and C streets, North West. It is believed that this building will be completed in about two years and it is to house all of the activities of the Internal Revenue Bureau, which are now widely scattered throughout Washington.

The new Department of Commerce Building is being erected at a cost of $17,500,000 and is to be the largest building in the Triangle. It will be 1,000 feet in length along 15th Street, and will extend from the Mall to Pennsylvania Avenue and 14th Street.

An Archives Building has been authorized to cost approximately $8,750,000 and will be one of the most important structures in the Triangle group. The archives and valuable records of the Government which are now sheltered in various buildings will all be housed in this one structure. Designs are being made for other buildings in the Triangle group, for the Departments of Justice and Labor, the Interstate Commerce Commission and other independent establishments. The contemplated Triangle group will not only prove beautiful from an architectural and city planning viewpoint, but will greatly facilitate the operation of the various Government branches.

It is also expected that additional accommodations will be provided soon for the Legislative Branch of the Government by the construction of an addition to the House Office Building at an estimated cost of $7,500,000; and by enlarging the Senate Office Building, completing the quadrangle of which the present building forms three sides, through an expenditure of probably more than $2,000,000.

Park and Highway Improvements

An appropriation of nearly $5,000,000 has been authorized for completing the park between the Capitol and the Union Station and also for carrying out the long delayed plans for the development of the Mall. At the western end of the Mall, the Arlington Memorial Bridge is now under way and when finally completed will have cost about $15,000,000. This development will include, in addition to the bridge, the construction of a plaza west of the Lincoln Memorial, the improvement of Columbia Island in the Potomac, a formal terraced avenue on the Virginia side leading to Arlington Cemetery, and the widening of several streets in Washington to give the proper approach.

Among those who have been especially active in carrying forward this beautification program, Secretary Mellon mentioned Edward H. Bennett of Chicago, who was appointed consulting architect of the Treasury and has developed many of the plan's features with the aid of a small group of other eminent architects from various sections of the country. The Fine Arts Commission, the Capital Park and Planning Commission, the Office of Public Buildings and Parks, and the several senators and congressmen closely connected with this work were also complimented by Mr. Mellon for their cooperation.

New Lighting Systems Installed in Two California Cities

WITHIN a period of three weeks two public celebrations of the completion of electrolier systems were held in cities of the San Joaquin Valley in California. On January 22 the Los Banos Chamber of Commerce held a banquet commemorating the turning on of current in a new lighting system in that city, while the Madera Business Men's Association staged a street celebration on February 9 when current was turned on for the first time in a new electrolier system lighting the business district.

Los Banos now is lighted by a system of electroliers that compares favorably with the street lighting of much larger cities. The new system consists of 90 standards placed throughout the business district, and extending north and south to the State Highway. These lines of light offer an invitation to the traveler passing along the highway at night, marking Los Banos as a progressive community worth visiting. The streets of the city are flooded with diffused rays that cause no inconvenience to the eyes of pedestrians or drivers.

Los Banos is justly proud of this improvement. The Chamber of Commerce banquet celebrating the event was attended by 175 residents and visitors including city officials, representatives from San Joaquin Valley civic associations, the San Joaquin Light & Power Co., and the Westinghouse Electric & Mfg. Co.

With a concert by the Madera High School band, speeches from a platform erected in the center of the business district, and amid the screams of sirens, the Madera Business Men's Association on February 9, celebrated the cutting in of current in a new electrolier system.

The new system consists of 52 standards on the main business street and extending one block on each side street leading into the main thoroughfare. The lamps provide an abundance of light which gives the city a distinctly metropolitan aspect.

Electric current for operating the two new lighting systems is supplied by the San Joaquin Light & Power Co.

NEW LIGHTING IN BUSINESS DISTRICT, LOS BANOS, CALIF., AND ONE OF THE STANDARDS

Existing Asset Recognized and Water-Works Rejuvenated

By HENRY W. TAYLOR
CONSULTING ENGINEER, NEW YORK.

THE city of Mechanicville, N. Y., has just completed a water-supply improvement that is typical of many cases encountered in the experience of the engineer, and the background and history of this development are of interest as well as the ways and means employed to rectify the former faults of the existing water system.

The original water-supply system in Mechanicville consisted of Plumb Brook reservoir, together with a 16-inch main to Willow Glen and thence along Saratoga Road and the Boston and Maine Railroad and the Delaware and Hudson Railroad yards, to the city proper. Plumb Brock reservoir intercepted the water from a watershed about two square miles in area, and provided a storage capacity of about 90,000,000 gallons. The quality of this water was decidedly variable, because of organic matter in solution and algae growth in the reservoir. The water is, however, comparatively soft, and is well suited to railroad uses. The sanitary protection of the watershed was fairly good.

COMPLETION OF WALLS OF MECHANICVILLE RESERVOIR, SHOWING FINAL EXCAVATION AND POURING OF ALTERNATE BLOCKS IN WALL

Old Supply Inadequate

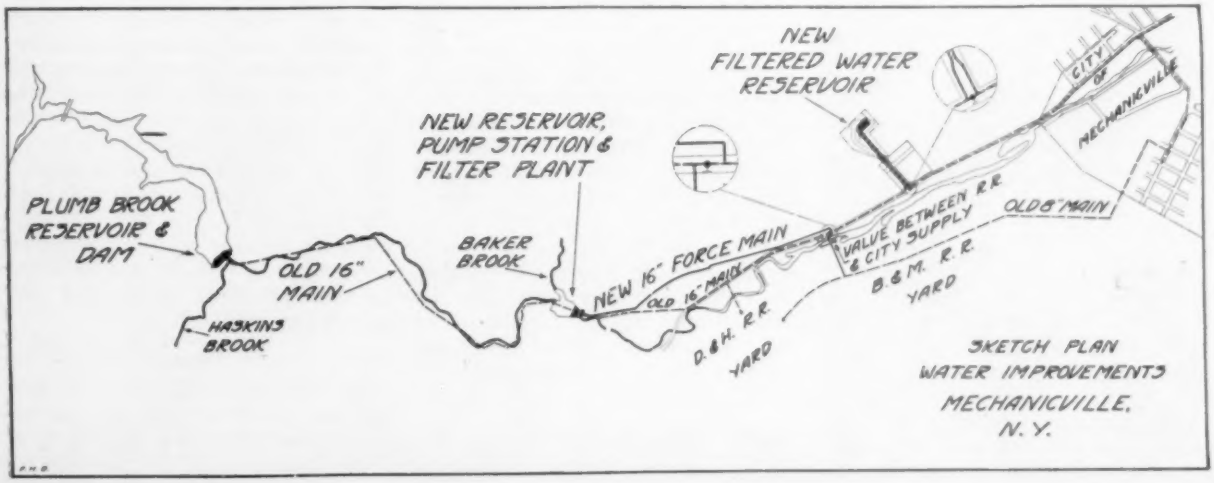
This original source of supply proved inadequate, on account of insufficient storage, and a second source of supply was developed on Plumb Brook, at Willow Glen, where the lower Plumb Brook shed, together with the watersheds of Haskins Brook and Baker Brook, could be intercepted. This secondary and lower watershed, is about 2.5 square miles in area. A low concrete dam was installed to flood a shallow area, which soon became a swamp and was productive of heavy algae and vegetable growths.

The original pumping-station was a small steam station, and adjacent to the station there was installed a four-unit mechanical filtration plant, without coagulation, together with a so-called roughing filter basin. The water from the small intercepting basin was passed through the roughing filter basin, thence to the filters and pumping-plant, and was pumped into the old 16-inch main to mix with the untreated Plumb Brook water.

The water from the lower Plumb Brook watershed is of about the same quality as that from Plumb Brook reservoir except that it has less color, but the flow from Baker Brook, is occasionally made highly turbid by a very finely divided clay present along the course of the brook, which is subject to flash-flows. The combined water from the lower sheds is not as well adapted to railroad uses as the water from the higher shed, and causes some trouble in the railroad yards, due to the clay in suspension.

Poor Condition of Supply

The foregoing gives a picture of the physical system as it was about 1920. The water-supply was at times insufficient, the quality was extremely variable, the steam plant was sadly in need of replacement, the filtering plant somewhat out of date and needing coagulation facilities, and the lower reservoir in bad condition. The daily consumption of water was about 1,800,000 gallons. The water-supply for all purposes consisted of about one-half raw water from Plumb Brook reservoir, and about one-half filtered and chlorinated water pumped into the 16-inch main at the



lower station. The water from the lower shed was needed only for a few months of the year as far as quantity was concerned, but pumping from the lower shed was carried on all the year in order to supply at least a partially filtered water, mixed with raw water in the 16-inch main, for city purposes.

Bonds for Improvements Fail

The situation led to the usual hunt for new supplies, with accompanying reports and investigations and estimates of several hundred thousand dollars. These schemes for a new supply were promptly voted down as involving too great an expenditure and large risks as to expected capacities and qualities of new sources.

Step by Step Construction Started

In 1924, the writer urged a study of the development of the present supply and a complete scheme was worked out in 1925, presented to the public and was voted down. The basic idea of this scheme was to develop a dual system, giving the railroads their water mainly by gravity and the city a filtered water from the lower shed. Such a scheme provided the best quality of water for each of these purposes, would reduce the necessary pumping by over one-half, and involved development of both sheds to fulfill the demand upon each. After the original scheme of development of the present supply had passed through several stages of revision and adjustment, a second effort was made to vote money for the work, but the plan was again voted down by taxpayers, who were by now entirely confused. However, the municipal authorities, forced to take some action, and feeling confident of the value of their present assets, if properly developed, undertook a scheme of construction, step by step, first using funds from the Water Department, and later bonding expenditures under the Home Rule Act.

DUAL PIPE LINE TO AND FROM NEW FILTERED-WATER RESERVOIR

The completed development devotes Plumb Brook reservoir and the upper Plumb Brook shed to railroad use. The storage on this shed is to be developed to conform to railroad needs and to be augmented when necessary by pumping unfiltered water from the lower shed. This water is chlorinated by injection, and at drinking fountains, restaurants and offices, local small pressure filters are installed to give a clear water for potable purposes. On the other hand, the filtered and pumped supply for the city is pumped from the lower shed through a separate force main to a new filtered water reservoir and thence to the city. There were involved additional storage on the lower shed, a new pumping plant, remodeling of filters and accessories, a new force main, and a filtered-water reservoir.

Progress by Years

In 1925, the low-level reservoir was enlarged and the whole area cleaned out, the dam was raised, and a by-pass channel constructed around the reservoir area, so that the flash-flows from Baker Brook could be diverted around the reservoir before it had had the opportunity to color the lower reservoir water. In 1926 and 1927, the old steam station was replaced by an electric station, and the amount of storage in Plumb Brook reservoir was increased by about 15,000,000 gallons. Master meters were also installed. The pumping-station was designed for the completed development, but has been temporarily used in the same way that the old pumping-station was used, until the new filtered water reservoir and force main could be installed.

In 1928, the third step in the development was completed. A new 16-inch force main was installed to deliver the water from the pumps to a new 2,250,000-gallon filtered-water reservoir located on a side hill outside the city, together with outlet piping from this reservoir to the city distributing system. The old roughing filter basin has been remodeled as a coagulation basin, and the filtration plant has been overhauled. Hydraulically operated valves were installed, so that the by-pass channel around the lower reservoir could be put into operation by long distance control at the pumping-station. A complete three-unit chlorination plant takes the place of former apparatus and provides chlorination for the railroad supply, the city supply and a spare unit.

Results

Water from Plumb Brook reservoir, with its increased storage, is devoted to the needs of the railroads, which use over 1,000,000 gallons per day. As this water passes the pumping-station, it is chlorinated, and in the railroad yards about ten small pressure filters have been installed by the city at points where potable water is required, so as to give not only a chlorinated but a clear water to the railroad employees. The water-supply for the city is taken from the lower shed, and is filtered and chlorinated, and is then pumped to the filtered-water reservoir, which has a three-day storage and then delivered to the city distributing system.

The two watersheds can now be operated to supplement each other without the combination of filtered and raw water. The storage from Plumb Brook reservoir can, if necessary, be used to supplement a dry-weather flow condition at the lower shed, while excess water from the lower shed can be pumped into the old 16-inch main and to the high-level storage reservoir, should occasion demand. The lower reservoir will intercept flash-flows in summer months of the year, and will increase storage capacities by several fillings, by about 20,000,000 gallons. Flash-flows at the lower shed, which cannot be intercepted by the reservoir capacity there, can be transferred by pumping to the high-level storage. It will also be possible to coagulate turbid water from the lower shed prior to filtration and thus remove the heaviest load from the filtration plant, or flash-flows of undesirable water can be entirely diverted around the lower reservoir, thus avoiding damage to existing storage. The filtered-water reservoir makes possible the selective use of water from the lower watershed, and as the worst water conditions last for only a day at a time, both pumping and filtering can be discontinued for these short periods.

Future Work

The work already completed does not represent the complete execution of the scheme of development, and the next step will consist of raising the Plumb Brook reservoir dam to add about 50,000,000 gallons of storage, together with a third pumping unit for transferring excess water from the lower shed to this high-level storage reservoir. A second low-level reservoir can also be installed to supplement the storage on this shed. The feasibility of these future developments has been studied from the original conception of the scheme, and provisions for these additional elements has been made where necessary.

Costs

The total cost of this work to date has been about $125,000, and this expenditure will provide a total supply of about 2,800,000 gallons per day as

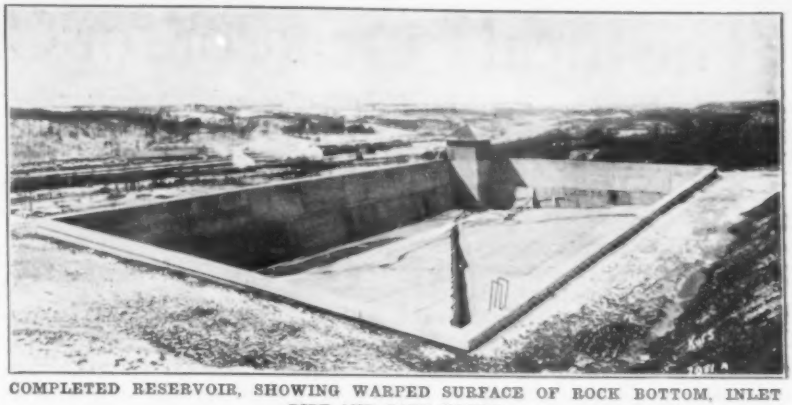
against an actual demand at present of 1,800,000 gallons per day. The next step in the development scheme will not be required for several years to come, but will consist of increasing storage, which, with an additional pumping capacity at the lower shed, will provide a daily supply of approximately 3,500,000 gallons.

Force Main

The new force main was installed of Universal pipe through a wet area where the laying of lead joint pipe would have proved difficult. This main starts at the pump house and extends to a point beyond the last lateral connection to the railroad yards and is connected into the old main, which now becomes a part of the force main and the filtered water system. The connection was made by installing a 16 x 16-inch split tee under pressure and inserting a new valve under pressure, the latter serving to divide the old main into two parts, one part acting as a gravity main to the railroads, and the other a force main for filtered water on its way to the filtered-water reservoir. At a point opposite the location of the filtered-water reservoir on the side hill above the old main, two connections were made under pressure, and a second valve inserted under pressure, between these connections. This insert valve diverts the water from the pumps to the reservoir, and one connection mentioned above serves the inlet main which delivers the water to the reservoir, while the connection on the opposite side of the insert valve connects with the outlet pipe from the reservoir. This double line of pipe to the reservoir is not hydraulically necessary but was supplied as an extra precaution against a colored water which might temporarily escape the pumping and filter plant operators. All water will be delivered to the reservoir without opportunity to pass directly into the distributing system, and at the reservoir will be retained for a few days and accidental color will be largely dissipated before reaching the reservoir outlet chamber. The inlet pipe to the reservoir rises in the northeast corner, while the outlet pipe draws from the diagonal corner and a real detention is secured.

Construction of New Reservoir

The new reservoir was built on ledge rock and on a side hill location. On account of the slope of the rock, the upper side of the reservoir is 10 feet deep while the lower side is 23 feet deep. The walls of the reservoir were built in alternate blocks in two tiers, and the intermediate blocks were run after the first blocks had experienced their setting contraction. Between blocks a deep sliding key was used, the key-way being cast in the first set of blocks and painted with asphalt paint, and the concrete keys of intermediate blocks reinforced against pulling away from the block itself. Construction cracks were then lightly calked with lead wool, whenever any treatment was needed.



COMPLETED RESERVOIR, SHOWING WARPED SURFACE OF ROCK BOTTOM, INLET PIPE AND GATE HOUSE

The bottom was left in its natural contour as attempts to remove knobs of rocks only increased the irregularity of the rock surface

The concrete was specified to be a 6-bag concrete, and a good grade of crushed stone and a clean, black, washed sand were used for aggregate. The average cement used was about 5.6 bags per yard, which produced a hard, sound, dense mix of rather exceptional quality for such construction. The bedrock under the reservoir floor proved to be rather difficult to handle, in that attempts to reduce the humps in the rock contour resulted in increasing the irregularities rather than improving the condition, and the holes were finally filled with gravel to give a reasonably regular floor and avoid excessive concrete quantities. In the gate-house of the reservoir, there will be installed a new type of Gurley long-distance water-stage recorder and indicator for the information of the pump operators.

The remaining construction involved nothing of particular interest. A ten-year problem has been solved by development of an existing supply with possibilities, and there are in reserve developments which can be added as further steps in the original scheme of water-supply improvement.

The work was done for the Department of Public Works, Frank G. Ferris, Commissioner, and with the cooperation of John H. Sheehan, City Engineer.

How Fire Police Function in New York Communities

A SURVEY of 36 cities and towns in New York State by the State Bureau of Municipal Information discloses that 29 of them have fire police units in some form or other

In most instances, these fire policemen are members of the regular fire department, assigned to police duty only at fires. One or two of the municipalities, however, have a separate force of fire police who, although working with the fire department, are actually an independent group. Two of the seven communities which do not maintain a special fire police unit do utilize their firemen for traffic duty at schools. This is outside the realm of police work at fires, however, and in such contingencies these places depend upon the regular police force to patrol streets, direct traffic, prevent looting, etc.

Ithaca offers an example of how the fire police are organized and operate in many of the New York State cities. There, the fire police company is organized, equipped and regulated in the same manner as other companies in the fire department and does salvage work also. This particular company is equipped with one 6-cylinder, 72-hp. motor squad wagon, coats, boots and hats for twelve men, ten 12 by 14-foot oilskin and rubber tarpaulins, six gas masks, 600 feet of rope, first aid kits, sledges, etc. The duties of this company are to establish fire lines and police them; to move or protect stocks and furniture with tarpaulins; to render first aid to injured men or others as needed. Members of this unit are sworn in by the city as fire police and have full police powers during fires.

Poughkeepsie appoints one man from each fire company to act as a fire policeman. The candidates are recommended to the police commissioners by the fire chief and given special badges to designate their status. Their duties are to clear the streets and to keep spectators outside the fire lines. The right to arrest persons is theirs only at fires.

Peekskill follows much the same plan, but its fire patrol is composed of five men from each of the five companies, yielding a total of 25 fire policemen. These men do salvage work also and, whenever on the streets, check up on violators of the parking law forbidding automobiles to park within 10 feet of fire hydrants. Port Chester's fire patrol unit consists of 26 men, appointed by the deputy sheriffs. They receive no compensation unless ordered to remain on duty at a fire after the recall has been sounded.

The Ideal Purchasor for City or County

His Qualifications, Relationship with Salesmen, Appointment, Tenure of Office, Salary and Bond

By RUSSELL FORBES

SECRETARY, NATIONAL MUNICIPAL LEAGUE; DIRECTOR, MUNICIPAL ADMINISTRATION SERVICE

THE personnel of a purchasing office is even more important as a factor in successful administration than is the law which governs it. No matter how satisfactory may be the law or administrative rules and regulations, a purchasing office will not properly discharge its function if it be manned by a barterer who decided what to buy on an inadequate or unqualified staff.

The most important factors for successful administration of this office are the qualifications, methods of apointment, tenure of office, salary and bond of the purchasing agent, which are discussed seriatim below.

Qualifications

The directing heads of public purchasing offices bear a variety of titles, such as "purchasing agent," "purchaser of supplies," "commissioner of supplies," and "business agent." In this book such official will be referred to as the "purchasing agent," the title most frequently conferred upon the individual performing comparable duties for private corporations.*

Upon the purchasing agent rests the major responsibility for the success or failure of the office. Although in large organizations the purchasing agent cannot personally perform all the routine duties, he is nevertheless held accountable for executing the policy prescribed by law or by his supervisory superiors. The forms in use, the procedure followed, the qualifications of the subordinate staff and their attitude toward their work have much to do with the smoothness of operation and the success of the purchasing office; but more important are the qualifications and the personality of the directing head. The successful purchasing agent of today is generally a man of exceptional qualifications.

He should be endowed by nature with good judgment, shrewdness, tact, a sense of values, foresight, initiative, and, above all, common sense. Supplementing his natural equipment, he should have business training and experience, a thorough familiarity with market conditions, and an intimate acquaintance with the commodity requirements of the government units which he serves. Formerly the ideal purchasing agent was the basis of price alone, and who was not above "sharp practice" in his dealings with suppliers. But to-day quality and performance are considered of equal importance to price as buying determinants.

Relationship with Sales Representatives

The purchasing agent occupies a unique position in the government in his relationship with sales representatives of supplying concerns. When purchasing is centralized, the salesman carries on his negotiations with a single office; whereas, under the decentralized system, if he failed to sell to one department, he still had a chance to sell to other departments. It is important, therefore, for the purchasing agent or his subordinate buyers to give a fair reception and hearing to every salesman whose line of merchandise is used in the public service, if the government is to maintain a good reputation with the outside business world. The human equation cannot be entirely eliminated from buying. The purchasing agent, in every contact with a salesman, is the representative of the government; the attitude of the salesman, often a taxpayer, toward the whole government, will be tempered by his liking or disliking for the purchasing agent. Since the purchasing agent can fill an important role in creating good will and confidence in the public mind toward the government, it is essential that he exhibit a spirit of cordiality and fair play toward all visitors to his office. Furthermore, situations are bound to arise where extraordinary service from the vendor is necessary to cope with an emergency. Such service is easier to secure from the supplier who has been given a square deal by the purchasing agent. Friendliness never fails to pay dividends.

The purchasing agent should know the true value of what he is buying, but must be fair enough to concede a margin of profit to the vendor. While he cannot be expected to know everything, he should know enough about the salesman's line to discuss it with him intelligently, else he may be victimized. If, however, the purchasing agent has established a reputation for fair dealing, the salesman will be less likely to take an unfair advantage. The purchasing agent who is uniformly suspicious of, and churlish toward, salesmen, and who is consistently a "price-buyer," in the long run will pay higher prices and thus penalize the government he represents for his own shortcomings. Many public purchasing agents dispense with examination of samples and conferences with salesmen because they are required by law to accept the "lowest and best bid"; but the selection of the best bid will be made on a more scientific basis when the buyer knows the quality which each bid represents.

A purchasing agent can gain a liberal education from the salesman. Every

Governmental Purchasing

is the title of a new book from the press of Harper & Brothers, from a portion of Chapter IV of which the accompanying article has been abstracted. The volume embodies the results of a five year study, by Mr. Forbes, of the functioning of the purchasing systems in the Federal, state, county and municipal governments in the United States and Canada, and a concurrent experience in helping to install new procurement methods in purchasing offices. The chapter headings indicate the scope of this important book:

Preface; General Aspects of Centralized Purchasing; Purchasing in the Federal Governments of the United States and Canada; Purchasing in State and Local Governments of the United States and Canada; The Organization and Administration of a Purchasing Office; Standardization in Governmental Purchasing; Determination of Purchase Requirements; Purchase Negotiation; Contracts and Orders; Inspection and Testing; Storage and Stock Control; Accounting Control Over Purchases. Appendices—Savings of Centralized Purchasing, Pittsburgh, Pa.; Existing and Recommended Laws on Purchasing; Selecting the Purchasing Staff; Salary Data and Job Specifications; Standardization Procedure. Bibliography and Index.

* Although the term "purchasing agent" is almost universally established as the title for the head of the purchasing office, the writer believes that "purchaser" or "purchasor" would be a more fitting title, and more in line with the titles of other public officials such as the "mayor," "governor," "comptroller," or "auditor."

sales representative should know more than the buyer about the manufacturing processes, the performance record, and the suitability of his goods for the government's requirements. By conferring with the representative of each competing vendor, the purchasing agent will be prepared to decide which is really the lowest and best bid, and will acquire a cumulative knowledge of the qualities best adapted for the public service.

The purchasing agent must, however, sharply differentiate between friendship and bribery. The buyer, like Caesar's wife, must be "above suspicion." He cannot afford to jeopardize his personal reputation and the reputation of his government by accepting gifts which may be thinly disguised bribes for diverting past or future orders toward the giver.

Tact, Diplomacy and Leadership

Tact is required, too, for the purchasing agent's relationship with the officials of the using departments. He should know what each using office is doing so that he can supply the kind and quality of commodity best adapted to its requirements. This knowledge should be first hand, if possible. He should not try to force upon using departments his choice of quality, but rather should make every consistent effort, within the limits of established standards, to meet the demands and wishes of the users.

Tact and diplomacy are especially to be desired in the purchasing agent who is in charge of a newly established central purchasing system. To take over without friction the buying functions formerly carried out by individual departments is no mean task. As soon as possible after taking office, the purchasing agent should visit each department head and discuss with him his work program and his commodity requirements. With the proper personality and with the proper attitude of service, the purchasing agent can thus go far in breaking down the traditional opposition of using officials toward centralized purchasing. . . .

More important still, the purchasing agent should possess the ability to instill and to maintain the proper *esprit de corps* in his own staff. A small staff will often do more and better work for a directing head whom they like and respect than will a large staff working under a purchasing agent whom they dislike. To build up the necessary morale in his office, the purchasing agent must first of all be himself a worker. He must know and have the proper appreciation of what each staff member is doing. He should be "on the job" and, by his own industry and zeal, set the example for his subordinates.

To measure up to the requirements of his office, the purchasing agent should have time to study and to plan. Many purchasing agents are helpless to avoid the charges made against them, of churlishness towards salesmen and of ignorance of purchasing technique and of the needs of the using departments, because they are so burdened with details and handicapped by lack of assistants that they must stay in their offices and be everlastingly at work in order to keep ahead of the procession of day-to-day duties. Purchasing will not reach its true stature until the government recognizes the office of purchasing agent as an executive rather than a clerical position. The purchasing agent should be relieved of petty details, and given enough help and funds to plan and execute his work leisurely.

In 1925 the Commission on Efficiency and Economy of Baltimore appointed a subcommittee on purchasing, composed of the state purchasing agent and buyers for several leading private corporations, to recommend a purchasing system for that city. The committee recommended, in part, that: "The purchasing agent should be, above all, a man in whom implicit confidence can be reposed, one above reproach as to character and square dealing, a man capable and experienced." Purchasing demands broad qualifications and offers excellent opportunity for acquaintance with governmental administration. The office of purchasing agent therefore presents an almost unparalleled training for higher executive positions in the public service. Many public officials in the higher ranks have started their careers in the purchasing office.

Appointment

The means by which the purchasing agent is inducted into office depends upon the place of purchasing in the government structure. . . .

In counties, the purchasing agent is generally appointed by the county board of supervisors or commissioners. This is the case in all the counties of California and New York which have centralized purchasing, with the single exception of Monroe County, N. Y. The county board in North Carolina may designate one of its members as purchasing agent, or may select an outsider. This wise provision allows latitude for the nature and complexity of the task, so that in large and populous counties, where the county board has a multitude of duties, a special appointee may be installed.

The purchasing agent in cities is generally appointed by the mayor or manager. In "strong-mayor" cities, the mayor responsible for administration appoints individuals who will carry out his policies; and thus appoints the purchasing agent if purchasing is a separate department or unit. The same plan is followed in manager-governed cities. Where purchasing is the function of an administrative board, generally appointed by the mayor, the purchasing agent owes his appointment to his administrative superiors.

The same principle of administrative control should follow where purchasing is a division of a department. . . . The individual responsible for administration should be vested with authority over his division chiefs. The head of a purchasing division should, therefore, be appointed by the head of the department.

The exceptions to this rule are found in some of the states, counties, or cities which have civil service systems. The advantages of the merit system in government are too obvious for refutation, and the arguments for divorcing the administration of a purchasing office from political control are too numerous and potent to be gainsaid. Nevertheless, the theory of centralized responsibility demands that the administrative head of the government or the department should have the choice of the official upon whom he must depend for policy execution. Civil service regulations, in protecting government employees against the spoilsman, have sometimes made removal so difficult that the administrator finds his best intentions baffled by a department or division head over whom he has little control. On the other hand, the success of certain purchasing offices can be attributed to the security of tenure of the directing head in the midst of a spoils-ridden administration. . . .

The purchasing agent should be selected only because of his technical qualifications and not because of his allegiance to a political party. Ability to deliver votes does not necessarily mean ability to purchase. True enough, a man of good business sense and high intelligence can learn the technique of purchasing after he takes office; but he should have acquired such knowledge before taking office. Prior experience in a private or public purchasing office is the prime essential. The purchasing agent should have a sound and practical business training. The law establishing centralized purchasing in Washington wisely provides that the state purchasing agent shall have had experience in commercial pursuits and in accounting prior to his appointment. The committee which recommended a purchasing system for Baltimore, in its report referred to above, outlined the following specifications for the selection of a purchasing agent: "Fitness and ability

should be the sound basis and only consideration for, not only the original appointment, but for continuance in office. This should be based on:

"(a) Thorough experience in the profession of purchasing.

"(b) General reputation for honesty, fidelity and expressed ability in achievement.

"(c) The appointee should be at least thirty years, and not over fifty years, of age.

"(d) He should be capable of passing a first-class physical examination.

"(e) He should be a man of known purchasing ability, and preferably familiar with the city of Baltimore."

. . . .

Tenure of Office

When the purchasing agent is appointed, his tenure of office is frequently the same as that of the official making the appointment. The appointment itself is usually for an indefinite tenure, but subject to the pleasure of the appointing officer. This means that the appointee is subject to removal at any time and may be supplanted upon a change of administration if not before. When the purchasing agent enters office under civil service regulations, he generally holds office until removed for cause and in the manner prescribed by law. But in some governments the purchasing agent is appointed for a definite term, ranging from one year to six years. . . .

Continuity of tenure is of course highly desirable. Even the best qualified purchasing agent will find himself handicapped for a time by unfamiliarity with the workings of the government, and may not become orientated to his task for several months or a year. A short-term appointee may only be reaching the maximum of his efficiency when his term of office expires. The purchasing agent should be kept in office as long as he produces the desired results. This is possible even when the office is appointive. . . .

Salary and Bond

Generally speaking, public purchasing agents receive much lower salaries than purchasing agents for private corporations. The average salary of public purchasing agents is about $3,600, while the average salaries of purchasing agents in private business is nearly $5,000. This represents false economy. A government cannot expect to secure an executive for a clerk's salary. The salary of the purchasing agent of Monroe County, New York, is established by law at $2,500. The city purchasing agent in Auburn, New York, receives an annual salary of $1,700; Schenectady, New York, $2,000; Watertown, New York, $1,500; and Yonkers, New York, $2,800. The state purchasing agent of Vermont receives only $3,000 per year. The purchasing agent of Saluda County, South Carolina, receives the munificent salary of $600 per year, "payable monthly." Such salaries are not likely to attract the proper caliber of purchasing agent. One of two results is likely to follow: either the office will be filled by a clerk who cannot secure any higher salary elsewhere, or an ambitious purchasing agent will be tempted to supplement his salary by outside work or by "graft" in connection with orders.

The purchasing agent should be paid a salary high enough to attract a man of proper qualifications. A qualified incumbent should not be penalized because he is a public servant.

Fortunately, the trend is decidedly in the direction of higher salaries. The purchasing agent in Milwaukee receives an annual salary of $4,000; in the state of Arizona, $4,800; in the states of New Jersey and Montana, $5,000; in Los Angeles County, $5,400; in the state of Pennsylvania, $8,000; in the city of Detroit, $10,000; in the city and county of San Francisco, $10,000; and in the city of New York (department of purchase), $12,000.

The salary of the purchasing agent should not be established by law, but should be left to the discretion of the budget-making authority from year to year. If stated in the law, the salary cannot be raised to keep pace with the trend of salary increases, without re-enactment, which is a slow and laborious process.

Some purchasing agents are required to give a bond, payable to the employing government, as a safeguard against defalcation of funds or other malfeasance in office. The premium of the bond is usually paid from the public treasury. . . .

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Park and Recreation Provisions in Municipalities of New York State

ROCHESTER is exceptional in New York State in its per capita provision for recreation. Public parks embrace 1,777 of the 23,017 acres within the corporate limits. The city operates 30 playgrounds in these parks and elsewhere. There are also athletic fields, provisions for skating and coasting, and for polo. Two outdoor, and one indoor, swimming pool with two public bathing beaches provide swimming and aquatic sports opportunities. There are regular provisions for public band concerts, and there is one public dance hall. The city has all the regulation playground equipment. The whole program is carried on under direction of the Bureau of Parks of the Public Safety Commission, which also operates a summer camp for residents who enjoy a back-to-nature vacation not too far from home.

Rochester, according to the 1925 state census, has a population of 316,786, and is the second largest municipality in the state, exclusive of Greater New York. The above data concerning its recreational equipment are taken from a study recently issued by the New York State Bureau of Municipal Information, at Albany.

Buffalo also ranks high. To quote further from the above study, Buffalo for its population of 538,000, has 75 public parks embracing 854 acres within the city, and three parks outside the city limits with a total of 364 acres. The 19 playgrounds in Buffalo, like those in Rochester, are equipped for a variety of organized activities, and there are three outdoor swimming pools and two public bathing beaches.

The part of the study devoted to recreational areas shows that Utica, with a population of 101,604, has 25 parks with a total of 760 acres. Albany, with a population of 117,820, has 24 parks with a total of 294 acres.

North Tonawanda provides a 50-acre park for the 17,356 inhabitants; Troy, 200 acres in 6 parks for a population of 72,223; Binghamton, 12 parks of 296 acres for a population of 71,915; and Schenectady, 355 acres for a population of 92,786.

Among smaller municipalities, Ilion, with a population of 10,426, has five parks of 300 acres; and Peekskill, with a population of 17,993, has two parks of 75 acres.

In addition to parks, and to playgrounds and general play facilities provided in almost all municipalities of any size, a total of 46 outdoor swimming pools and three indoor swimming pools are reported from all municipalities. Thirty-one municipalities report provisions for band concerts, and 14 report municipal dance halls. Seventeen places, mostly smaller municipalities, report sites for tourist camp use.

Administration of park and recreation facilities in 72 places for which this information is shown, is in the hands of various municipal departments ranging all the way from the city manager, as in the case of Auburn and Sherrill, to an especially created Park Bureau functioning under a Commission of Public Safety, as in Rochester, or under a Common Council, as in Glens Falls. The Department of Public Works is most frequently the managing authority in larger municipalities, and the Board of Trustees in villages. Amsterdam has both a Park Commission and a Recreation Board; Batavia has a Park Commission; Mt. Vernon and Newburgh have Recreation Commissions; New Rochelle has a Park Commission; so has Norwich. Oneida has a Park and Playground Commission; Salamanca has a Park Commission; Syracuse has a Park Department and Yonkers and Utica, Park Boards.

Street-Cleaning Methods in the West and Southwest—Part II

By THESTA KENNEDY
RAYNE, LA.

St. Louis, Missouri

In St. Louis all the hard-paved streets are cleaned at regular intervals. Hard-paved streets include those paved with asphalt, bitulithic, granite block, concrete, brick, and wood block. The streets in the residential district of the city are cleaned about once each week; those in the business section and downtown section are cleaned each week-day.

The equipment used includes nine 2,000-gallon capacity motor flushers, three motor-driven vacuum sweepers, four squeegee trucks, fifty two-horse wagons, and about twenty-five 2-ton motor dump-trucks used for pick-up purposes. The vacuum sweepers are owned by a private corporation, and are paid for the sweeping of the streets at the rate of 79 cents per great square; the rest of the equipment is owned by the city.

The cost of flushing the streets with the flushers is approximately 50 cents per great square. The white wings are paid $3 a day. There are 600 miles of hard-paved streets to be kept clean by the Cleaning Section of the Street Division. For the fiscal year ending March 31, 1928, the Street Cleaning Section expended $604,600.

(Data furnished by J. M. Slater, Street Commissioner.)

Springfield, Missouri

Springfield has about 105 miles of paved streets, which are kept clean by two motor sweepers, which sweep an average of 20 miles a day each. The business section of the city is swept at night, and during the day, men with carts and brooms go over the business sections and keep the papers, rubbish, etc., picked up.

(Data furnished by H. F. Emerson, Superintendent of Streets.)

Houston, Texas

The city of Houston is now operating five flushers for street cleaning as well as nine street sweepers. The flushers are of 1,500-gallon capacity with 60-pound pressure, and have sprinkler attachments. The cost of operation is very nominal, consuming an average of 22 gallons of gasoline per day to cover 7 or 8 miles. As a sprinkler, this machine covers about 30 miles per day, consuming 20 gallons of gasoline. In 1927, the city sprinkled and flushed 16,030 miles of streets, using 27,775,250 gallons of water.

The department has a vacuum sweeper, which is used to great advantage in certain sections of the city that require sweeping during business hours, because it requires no water and is dust-proof. The remaining sweepers have proved entirely satisfactory. The city cleaned 19,051 miles of streets during 1927, and swept 89,412,693 square yards of streets, removing 10,994 cubic yards of sweeper dirt.

(Data furnished by B. S. Davison, Street and Bridge Commissioner.)

Galveston, Texas

Galveston has about 30 miles of hard-surfaced streets. Those in the business district are swept daily, while the outlying streets are swept every other day, using two motor-driven sweepers. They both operate day and night by using two shifts of drivers. When the hopper of the machine is full, it is dumped at some out-of-the-way corner, and the material is hauled to the city dump by a one-horse dray.

Four men with hand brooms sweep narrow alleys and odd corners which the machine broom cannot reach.

The business section of the city is swept at night, as it would be practically impossible to handle this work during the day on account of the parked cars, also on account of the accompanying dust nuisance.

One man with a large can on wheels, a hand broom, and a shovel works the business district during the day to clean up horse manure and other unsightly and unsanitary rubbish promptly.

(Data furnished by W. B. McGarvey, Assistant City Engineer.)

Wichita Falls, Texas

Wichita Falls has been cleaning its streets since 1908. Hand cleaning by push-brooms and horse-drawn brooms has been used, but now motor pick-up sweepers are used. The city has two motor pick-up sweepers, which clean the 83 miles of pavement, the majority of which is of the reinforced concrete type. The cost averages 25 cents per thousand square yards.

The downtown streets are cleaned daily by sweeping and occasionally flushing. Formerly, flushing was used altogether on the downtown streets, which is more effective, but on account of drainage conditions it was necessary to discontinue this method except at intervals of about every fifteen days.

The rotary brooms with sprinklers always leave a dust film, the result being that the streets are not entirely clean, but flushing cannot be extended, because the storm sewers are not large enough to prevent stoppage from dust and mud washed from the street.

(Data furnished by G. D. Fairtrace, City Manager.)

San Antonio, Texas

In the street cleaning department of San Antonio six small tractors are used on the night shift and ten during the day. All paved streets within the one-mile circle are swept daily by the use of six tractors, eight wagons and drivers, and five push-broom men to each tractor. This force is divided into three crews, each of which covers approximately 30 miles of paved streets. All paved streets beyond the one-mile circle to the city limits are swept every other day by the day force. This force consists of ten sweepers, ten wagons and drivers, and twenty-five push-men. The territory covered by this force is divided into eight districts or routes and the force is divided into five crews, each crew covering about 30 miles of paved streets.

When a street is swept, two sweepers are used; one takes the middle half of the street and sweeps the dirt in the path of the second sweeper, and this sweeper in turn sweeps the dirt into the gutter. A man equipped with a push-broom follows behind the second sweeper and sweeps the dirt that has been swept into the gutter into small piles about fifteen feet apart. This push-broom man is followed by a pick-up truck with one man who picks up the small piles of dirt and hauls it to a dumping-ground.

(Data furnished by J. Rubolis, Commissioner of Parks.)

Dallas, Texas

The street cleaning department in the city of Dallas is operated under the city engineer at an expenditure of about $120,000 per year. The department is composed of a superintendent, one night foreman, twenty-one flusher drivers, eight truck drivers, thirty-two white wings, twelve laborers, nine flushers with capacity of from 1,000 to 1,500 gallons of water, and four dump-trucks

These men and equipment are divided into two shifts—one day, and one night. The night shift cleans the downtown section, beginning with the flushers at about 9:30 in the evening. The streets are thoroughly flushed and this is followed up by white wings who go on daily about 5:00 in the morning and sweep and pick up all refuse that is left in the gutters by the flushers. The day crews are used in the suburban business sections and in the residence districts. These are cleaned on an average of three times each week. All storm sewer inlets are cleaned and disinfected in the downtown districts twice each week. About 20,000 gallons of water is used daily in flushing the streets.

(Data furnished by E. M. Belk, Chief Clerk.)

Shreveport, Louisiana

The first equipment for street cleaning in Shreveport was bought in 1902, and consisted of two 9-foot rotary brooms, which were pulled by horses. Carts were used to follow the sweepers and pick up the sweepings from the gutters.

In 1922, the city obtained from the United States Government three FWD trucks, salvaged from the World War equipment, and later another one. These were equipped with 1,200-gallon water tanks and force pumps, and are still in use in flushing the streets. These flushers use 36,000 gallons of water per day on an average and have to cover paved streets of about 140 miles. The downtown district is flushed every night, the residence streets once each week, and the main streets in the residence district twice weekly. There are 18 one-horse carts for picking up trash that is not washed into storm sewers. These carts work the downtown section each night except Sundays, and are used where most needed in the residence district.

The sum of $35,000 is allowed for street cleaning for an entire year, which is to be increased as the paved-street mileage increases each year. Practically all the streets are asphalt surface laid on a concrete base. The old brick, wood block, and concrete streets have about all been resurfaced with asphalt. There is a superintendent at the head of the department.

(Data furnished by R. N. McKellar, Commissioner of Streets and Parks.)

Monroe, Louisiana

In Monroe there are approximately 30 miles of paved streets, which, with the dirt streets, are kept reasonably clean. The city operates one flusher, one pick-up sweeper, and four dump-carts with two men on each with push-brooms.

(Data furnished by W. Atkinson, Commissioner of Streets and Parks.)

Fighting Traffic Violations by Concentrated Surprise Attacks

WHILE the majority of potential violators of the traffic laws are responsive to the customary educational programs sponsored by civic bodies interested in traffic control problems, there are always many motorists who must be impressed in a more striking manner, asserts Chief of Police O. W. Wilson of Wichita, Kans.

Speaking at the Central States Safety Congress recently, Chief Wilson contended that the Police Department is the agency to deal with these chronic violators and outlined his theory of the proper method of procedure.

How to Impress Chronic Violators

It is desirable, of course, to enforce the traffic laws with a minimum number of arrests, Chief Wilson said. But in dealing with the hardened motorist, he believes that the police must impress him with the constant danger of arrest in order to emphasize the absolute necessity of his observing the traffic regulations. To make such an impression forceful and permanent, the police official advocates the application of three principles of military strategy. These essentials he outlines as the concentration of the attack by the police, the maintenance of the superiority of the attack, and provision for an element of surprise.

"In carrying out this program, it is necessary to be provided with certain information from the local record bureau in order to operate most intelligently and effectively. From the accident sheets it is possible to determine the locations sustaining the greatest hazards, the time of day for each location when the hazards are at their peak, and the types of violations which are creating the hazards at these periods. When this information is available, it is only necessary to operate according to the above-mentioned rules in order to eliminate the hazards, if that hazard results from some form of violation and is not the result of neglected engineering work in re-routing, marking or signalling. Concentrated drives in these locations at these times against such violators should be continued until the accident reports show a favorable decrease."

Concentrating the Police Drive

The purpose of concentrating the attack of the police traffic squad is to make the strongest impression possible, Chief Wilson held. If motorcycle officers make 10 arrests each through widely separated sections of the city each day, they would not arouse even passing comment. But if these officers concentrated their efforts on a single boulevard and made 100 arrests in a particular locality, it would be an event to be remembered for months, the chief maintains.

"The superiority of attack is to be attained by this concentration and by actually making the arrests. This is not the time to be weak-kneed about the drive. It must be carried through to a finish—the more noise the more effective will be the impression. Each violator either will have been arrested, have escaped arrest so closely, or have heard so much about the campaign, that he will operate his car with proper decorum for days to come. In other words, everyone in or passing through this particular locality, will have been properly impressed. And this impression will be much more effective and lasting than any impression which might have been gained as result of an equal number of arrests being made over a period of 10 days or longer.

"As soon as one locality has been properly impressed or educated, the traffic squad should swoop down on another locality requiring attention, and give it a similar course of purging. The element of surprise is provided by moving around at random, first here, and then there, without any regularity. This will keep the motorists on the alert, not knowing when they may expect another campaign, much more effectively than though they always expected to see a certain motorcycle officer at a particular place. This element of surprise in regard to location, time and type of violation, is of value also in keeping the officers themselves on their toes. Instead of becoming indifferent and stale as the result of the monotony of continually patrolling a certain locality, the officer's ambition is stimulated by his interest in what his next assignment may be."

Preliminary Education Desirable

To avoid the usual contention by the motoring public that it was unaware of the plan to enforce the traffic laws so strictly, each community should have a traffic-law enforcement committee that would coordinate the efforts of the various educational agencies and serve as a press agent for the special traffic squad's activity, Chief Wilson states. He suggests that possibly twelve violations might be selected and each given the attention of this committee and, through it, the attention of each educational organization for a month. The first two weeks of the campaign, he thinks, might well be devoted to intensive educational work which would be followed by the concentrated drive by the traffic squad, reaching those who are immune to the less spectacular and more subtle types of education.

FORWARD STEPS

Reported by

Municipal Officials, Chamber of Commerce Executives, and Others

Auditorium, Sports Arena and Athletic Field Form Civic Unit in Seattle

SEATTLE, WASH.—This city, with 400,000 population, has recently opened a new $1,110,000 auditorium, covering more than eleven acres. This building was much needed and is meeting increasing use by the public.

The project got its start toward ultimate success when a well-to-do Seattleite agreed to give $105,000 toward a civic auditorium if the city would match the gift. Through persistent work on the part of the Seattle Chamber of Commerce the sum was more than matched and after $900,000 in bonds had been sold the total stood at $1,110,000.

Meantime the Chamber of Commerce gathered information and plans of civic auditoriums in other cities, and from these data a most successful and practical plan was arrived at.

As a result the city of Seattle now owns and operates the only building in the country where auditorium, sports arena, veterans' hall and athletic field are all grouped together in one complete civic unit, and the only building designed to appeal to the varied tastes of so large a part of the population.

William J. Coyle, former Lieutenant Governor of the state of Washington, is manager of the auditorium. In this choice the city of Seattle has put a man of public ability at the head of a public project. This position is not elective and no politics enter into the system to mar its harmony.

Viewed from a distance the new civic group is massive. The buildings and grounds cover 11.8 acres or four city blocks. Hugh columns at the entrance are suggestive of the edifices built in the days of Babylon. (For another view, see the 1929 Municipal Index, page 146.)

ADEQUATE DRAMATIC FACILITIES

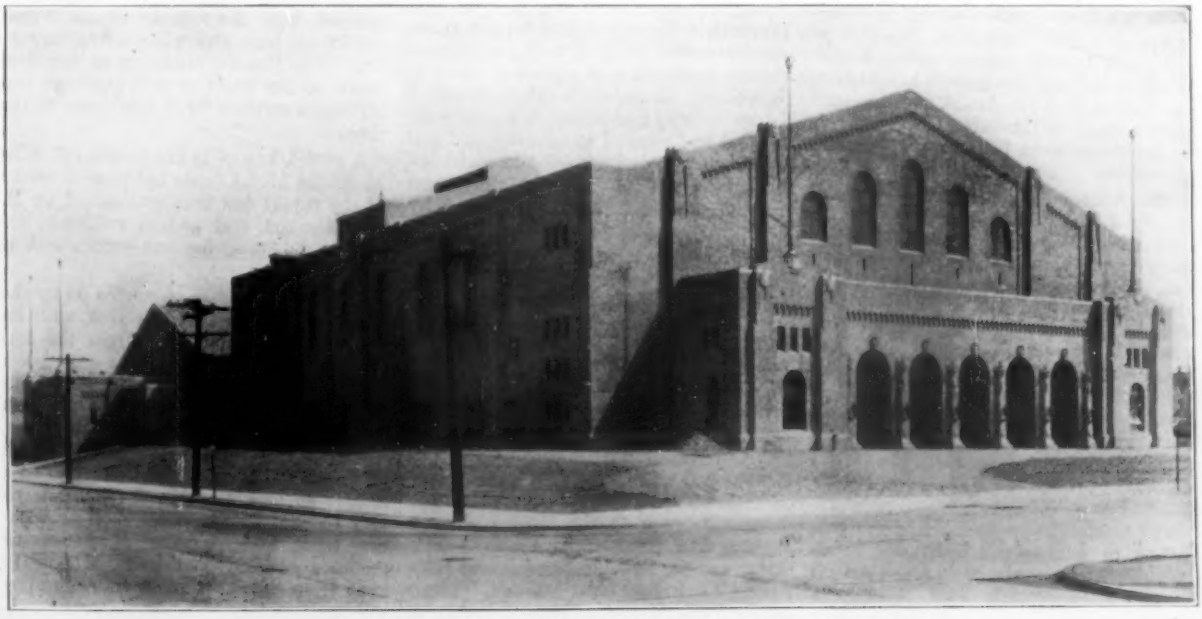
The auditorium is complete. A lobby, beautifully decorated and dignified by its huge proportions, first greets the eye of the visitor. From the lobby wide ramps lead off from either side to the balcony and several double doors open from the center to the main floor, which is 164 feet long and 152 feet wide and is made of beautifully grained maple, offering one of the finest dancing surfaces in the city.

The auditorium seats 6,000 people, 2,500 in the balcony and 3,500 on the main floor. The ceiling has been specially treated with acoustical felt to make the acoustics as effective as possible for such a large hall. Huge lighting fixtures of stained glass hung from the ceiling provide a soft but adequate light for the center of the hall, and stationary lights are set under the balcony. Artificial light is unnecessary in day time because of huge windows on each side of the hall.

At the opposite end from the entrance is a stage large enough to accommodate the largest-scale dramatic and pageantry productions. It has a 60-foot opening, and is 120 feet wide and 40 feet deep. Backstage there are 22 dressing rooms, including rooms for stars and larger rooms for choruses. An extra large elevator has been installed, opening on one side of the stage so that all sorts of stage fixtures or exhibits may be put on the stage easily. In a room to the left there is a kitchen capable of serving dinners to 3,000 people at a time. Here banquets of all kinds and sizes may be adequately prepared. With such complete equipment the auditorium's utility is materially increased. It now satisfies the requirements of practically every large-scale activity of the community and by the same token it will be used frequently, with periods of no income few and far between.

PROVISIONS FOR SPORTING EVENTS

The arena has a seating capacity of 9,000. The floor is of dirt, which allows indoor athletic meets, horse shows and other such exhibitions. During the ice-hockey season this building becomes an ice arena. The floor is flooded and a system of pipes laid several inches below the surface of the dirt, and connected with an ice plant in the auditorium,



NEW CIVIC AUDITORIUM AND SPORTS ARENA AT SEATTLE, WASH.

This $1,110,000 civic unit, with grounds, covers nearly 12 acres and is reputed to be the only unit of its kind to include an auditorium, sports arena, veterans' hall and athletic field all in one group

freezes the water and forms one of the finest indoor ice floors to be found in the country.

The basement of the auditorium is made of solid concrete with concrete pillars supporting the main floor. This basement provides a perfect place for keeping animals during exhibitions in either the auditorium or the sports arena. The heating plant will heat all parts of the building to any temperature wished, up to 100° F.

The outdoor athletic field adjoining the two buildings has covered stands at one end and one side, with bleachers at the other end of the field. Showers and locker rooms for the players are in a separate building at one end. High schools and city athletic clubs use the field continuously for ball games and field meets.

At present the arena has been leased to the Ice and Hockey Association for five months. Due to the very temperate climate of the Puget Sound country, ice seldom stays long enough on lakes and ponds to be of much use for ice skating and so when the new Ice Arena was opened, capacity crowds of enthusiastic ice skaters took advantage of the new idea. Seattle has now entered the Northwest Hockey League and so popular is the game that the 5,500 available seats have been sold out at every game. Anyone wishing to learn the art of ice skating may do so, for a staff of instructors is maintained at the arena for that purpose.

The auditorium has been in operation only about six months but it is the opinion of those in authority that it will pay its operation and maintenance. This idea would seem to be justified by the fact that the auditorium's calendar has already been kept pretty full and prospects for the future look even brighter.

OTIS E. SMITH.

Organized Public Sentiment Preserves a Single-Family District

MT. LEBANON TOWNSHIP, PA.—One of the most bitterly fought zoning battles engaged in since the general adoption of the zoning plan for American cities took place recently in this suburb of Pittsburgh, with opponents to lifting the restrictions victorious.

Mt. Lebanon Township lies approximately 7 miles southwest of Pittsburgh, and since the opening of the famous Liberty traffic tunnels under Mt. Washington, the development has been rapid. The township has increased in population in the last ten years from 1,800 to approximately 15,000, and is rapidly becoming the home community district for the city. Its valuation is second only to Lower Merion Township on the outskirts of Philadelphia. The community as a whole is highly restricted, yet provision for business and multiple dwellings has been made through zoning regulations.

The battle was precipitated by the projection of a $1,500,000 apartment house in a district along the main street set up as purely residential. Two magnificent homes already occupy the site. Their owners headed a syndicate backing the new structure, which was projected as a five- to seven-story building with four-five- and six-room apartments combined with a restaurant to serve the tenants.

Ordinarily, a $1,500,000 structure would be welcomed in any community, but the proposed location of the apartment house would have meant the transferring of the district from residential to multiple-dwelling zoning, a move which proved exceedingly unpopular to most of the surrounding residents and to the community as a whole. It was felt that this proposal would prove to be an entering wedge for a general breakdown of the zoning regulations.

The enabling ordinance was passed at first and second reading and a public meeting scheduled four weeks later, when the final reading and vote were to take place. In the meantime, the opponents organized. Literature was distributed and public meetings held. Aroused by the trend of growing opposition to the change, the backers of the proposed apartment wrote to the Commissioners asking that the petition be "withheld."

Not content with merely having the petition and ordinance withheld, which would make it possible to bring the matter up at some subsequent meeting when the opposition was absent, the opponents presented their arguments against the change and requested that a decision be made. When the final vote was taken, the ordinance lost by a unanimous vote.

While the action does not once and for all lay the ghost of changing zoning provisions at the will of the individual, it at least effectually acts as a barrier for the revival of this particular project in the near future.

J. V. LONG

Great Safety-in-Water-Sports Campaign to Be Repeated

JANESVILLE, WIS.—Last summer a 12-year-old Janesville boy was drowned while trying to swim. Resolving that no such preventible disaster should happen again, the *Janesville Daily Gazette*, which circulates through a wide section of southern Wisconsin, immediately inaugurated a Learn-to-Swim campaign. It was well organized and planned in advance, and had the cooperation of schools and social organizations of the region, and interest and enthusiasm were kept at a high pitch by daily illustrated news stories.

Two beaches were crowded daily, and two competent instructors were in charge, and gave lessons and life-saving demonstrations during the entire season. Inside of two weeks the following things had been accomplished by the newspaper: The Boy Scout organizations of southern Wisconsin had been enlisted as life-saving demonstrators. A swimming expert from St. Paul had been employed to give lessons at two beaches for two weeks. (This man drove 1,100 miles during that time from one beach to the other and gave three or four demonstrations a day.) The services of the Red Cross and Junior Life-Saving Class had been enlisted. Three Junior Life-saving organizations had been formed and 164 boys and girls taught to swim. One hundred and fifteen youths, in addition, had become competent life guards and first-aid instructors. Life-saving demonstrations had been presented to 10,000 people at the Janesville Fair, the demonstrators occupying the feature platform in front of the grandstand. Swimming lessons and life-saving classes were provided at Evansville, Palmyra, Whitewater, Jefferson, and other towns in the region. The Y. W. C. A. athletic instructor traveled about in the interest of the campaign and special attention was given in other ways to swimming safety for women and girls.

One of the chief attractions of the campaign was a water carnival given in Janesville one Sunday afternoon by the Red Cross and the Y. M. C. A. and witnessed by 3,000 people. Meantime, while conducting these activities, the Gazette was carrying daily swimming lessons, editorials and news stories in its columns, and was thereby arousing state-wide interest in adequate protection against water hazards. In Fort Atkinson, one of the towns of the section, steps were at once taken to put in a municipal pool, and the mayor and the chief of police transported 150 boys and girls in city trucks, the patrol wagon, and automobiles commandeered for the purpose, six miles to where a section of the campaign was in progress.

Swimming and life-saving instruction in and around Janesville and in the other towns mentioned throughout a large area, began in May and lasted through to the end of summer. In the early spring, before the summer campaign was organized, township picnics, for which the section is famous began, each an organized playday with games, fun and crowds galore. At each one of the most popular attractions last year was Edward Buyamo, a young Hawaiian Red Cross swimming instructor, just graduating from Milton College. The result was that the twenty township events, with the big county affair with which they were culminated early in the summer, were the occasion of 20,000 people having been giving life-saving instruction. The Gazette campaign as described came on the heels of this and also had Buyamo's services for a large part of the time.

A medal, known as the Howard F. Bliss Memorial Medal (after the pioneer owner of the paper) has been established by H. H. Bliss, son, and present publisher, for heroism in life-saving and carries with it a gift of $50.

The whole program as carried on by the paper will be repeated this year, with instruction given constantly from the season's opening till the beaches are closed. The paper has had a portable tank built which can be carried from one place to another by truck, and set up in towns, villages, and rural communities where there are no bathing facilities. The idea is that no person within the whole territory reached by the paper shall be without some understanding of life-saving methods and the knowledge of how to keep from drowning when an emergency arises.

STEPHEN BOLLES,
Editor, Janesville Daily Gazette.

Kankakee, Ill., Opens Its New City Hall

KANKAKEE, ILL.—With the official opening of the new City Hall a few weeks ago and the acquisition of several additional pieces of fire apparatus, this municipality has taken definite steps ahead.

Extended agitation for the erection of the City Hall culminated in the approval of a $175,000 bond issue in 1927 for that purpose. The improvised city hall quarters which the municipality had been renting were cramped and unsatisfactory. The new building was planned by Leonard F. W. Stuebe, an architect of Danville, Ill., and was erected during the administration of Mayor Louis E. Beckman, one of its leading advocates.

The structure is of Tudor-Gothic design, two stories in height with basement, and of red brick exterior, trimmed with Bedford stone. It is built in a U shape and has a clock tower over the main entrance, carrying out the Tudor-Gothic effect.

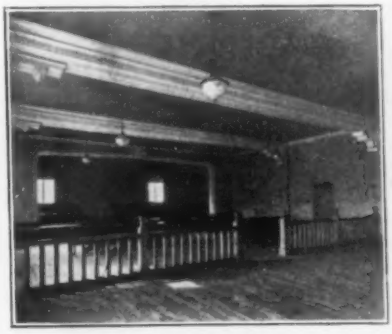
On the main floor are the Police and Fire Departments. To the right of the lobby are located the offices of the chief of police, desk sergeant, the station quarters and a reception room. To the left of the lobby and further down the hall are the office of the police matron and the women's detention cells. The patrol-car garage, police locker rooms and cells are on the north of the police department wing. The fire apparatus is quartered to the rear on the left. Three places are provided for trucks in the main station, while a fourth, which is separated, is for the chief's car. Along the west wall of the apparatus room is a hose-drying rack, and on the north of the fire department wing are the kitchen, dining room, lounge and workshop.

A marble stairway leads to the second floor, where the city offices and council chamber are located. The office and reception room of the mayor are in the southwest corner, to the right of the lobby. Down the corridor are the offices of the tax collector and city clerk, with a joint reception room; those of the building department and the city engineer, and a drafting room. Directly to the north of the lobby stairs is the police magistrate's court, with a private office and reception room in the rear. The court room is 28 by 19 feet and attractively finished and furnished, as are all the offices. To the left of the stairway are the offices of the city attorney and the superintendent of streets, while the corridor leads into the council chamber, 60 by 39 feet, in the west wing. Around the corridor to the left are the firemen's dormitory and the offices of the fire chief and health commissioner.

On the east side of the basement is a rest room and next to it the gymnasium for policemen, firemen and city officials. Immediately to the west of the gymnasium is the "bum room." Most of the west wing is devoted to storage space for the street department, the fuel bins and the heating plant.

The new fire equipment, obtained by means of a $30,000 bond issue voted last year, includes a 500-gallon pumper and chemical truck, a 1,000-gallon combination

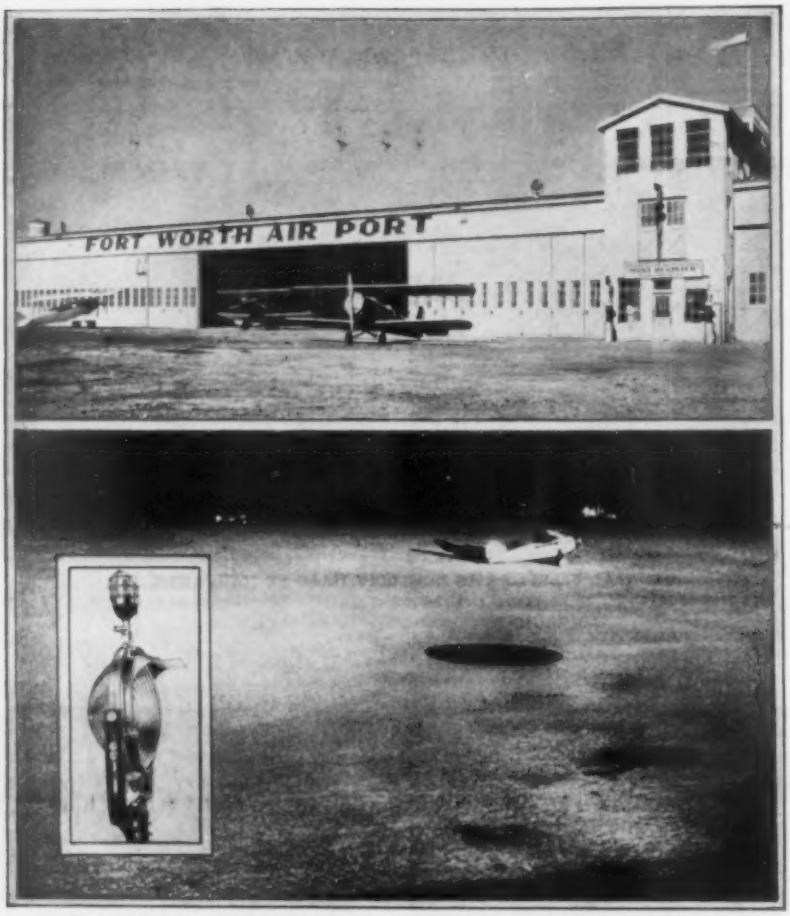
GENERAL VIEW OF THE NEW CITY HALL AT KANKAKEE, ILL.
This view is taken facing northwest and shows the general attractiveness of the building as well as its adequate proportions



LOOKING INTO THE COUNCIL CHAMBER ON THE SECOND FLOOR

FIRE APPARATUS ROOM LOCATED IN THE NEW BUILDING

KANKAKEE'S FIRE EQUIPMENT QUARTERED AT THE CITY HALL
The city recently spent $30,000 for additional apparatus, obtaining the three machines shown at the right in this photograph



HOW LIGHTING SYSTEM WORKS AT MEACHAM FIELD, FORT WORTH, TEXAS

Three of the six floodlights erected on the hangar roof are shown in the upper photograph, while all six of these projectors were operating when the night photograph, below, was taken. The floodlight shown in inset is the type used at this airport, minus the special obstacle-light fitting on top

pumper, an aerial truck with ladders, and many small items such as hose and connections, turrets, etc.

Both the Police and Fire Departments recently have been placed under civil service, and daily drills are held to assure their efficiency. Due to these changes, the city now is being re-classified by the Illinois Inspection Bureau.

EDWARD P. STRASMA,
Service Secretary, Chamber of Commerce.

Install Lighting System at Fort Worth Airport

FORT WORTH, TEXAS.—The night lighting equipment turned on recently at Meacham Field, the municipal airport, has attracted considerable attention because of its effectiveness.

Meacham Field presented a rather difficult lighting problem due to its unusual contour. The center of the field is somewhat higher than the surrounding area and there is a shallow section at one side of the airport. The airport management conducted extensive experiments in night lighting and the system adopted is sufficiently flexible to permit future extensions or alterations, if desired. It is known as the "distributed lighting" system and has been developed by The Pyle-National Company of Chicago.

Composing the system at the municipal airport are 12 field floodlight projectors, six of which are mounted on the hangar roof at spacings of approximately 170 feet. The remaining six projectors are to be placed in two groups of three each on the north and south sides of the field, spaced about 200 feet apart. These projectors are equipped with special rectangular spread lenses, 40-degree lenses being used, and all projectors having horizontal louvres which produce a sharp cut-off of the upper light beam.

During normal operation, only a portion of the 12 projectors are to be operated at one time, the particular arrangement depending upon the wind and other conditions. No matter which runway is being used, uniform lighting is obtained as shown in the accompanying illustrations.

The projectors are equipped with 1,500-watt, 110-volt, PS-52 lamp with C-5 concentrated filament giving maximum apparent beam candlepower. They have crystal glass reflectors and a tight-closing cast aluminum case. Each projector is positioned so as to place the light beam in accordance with the layout as developed in the drafting room and little field adjustment is necessary. Beams from adjacent projectors have a slight overlap, and due to the rectangular beam produced by the lenses, the entire field may be covered without leaving dark areas or causing excessive lapping.

Uniformity of illumination and small shadow casting by planes are noticeable features of this distributed lighting. The floodlighted building and stack shown in the background of the night photograph are examples of "perspective" lighting of obstacles, a method which gives true daylight proportion and location effects.

This lighting system for the Fort Worth airport was realized at an approximate cost of $3,000. The airport is used by three air mail and five passenger air lines.

WILLIAM FULLER,
Airport Manager.

Five Millions for More-Play-Less-Crime Program Is Expected to Yield Great Returns to Chicago

CHICAGO, ILL.—Every year nearly 20,000 boys in the city of Chicago run counter to the police department. Many of their offenses assume the proportions of series crimes. Many of the boys pass from adolescence with blighting "police records." A large-scale effort to meet this situation has been undertaken by the Chicago Boys' Club by a more-play-less-crime program which looks to the spending of $5,000,000, and the provision of five new club-houses every year for five years. This is confidently expected by its sponsors to reduce the city's crime bill by many times that amount, to save boys from careers that lead to the penitentiary, and to improve the "big city" environment in general.

"The enormous prevalence of crime in the United States can be traced largely to the fact that the play life of thousands of boys in crowded cities is neglected and that these boys find their own amusement by joining gangs that run to lawlessness. Supervised play is the remedy," says George A. Hughes, President of the Boys' Club. "Through properly directed play in the club the boy learns initiative, resourcefulness, expertness with tools, self-confidence, thoughtfulness, teamwork, loyalty, industry and high ideals." Mr. Hughes speaks from experience. The three buildings now being operated by the Boys' Club had an aggregated attendance last year of 284,703 boys, and his utterances are reinforced by the figures which show that only 2 out of every 1,000 club boys, as compared with the 70 of every 1,000 of the population in general, get into trouble with the police. The Boys' Club was originally organized to provide directed, wholesome, programs of recreation especially for neighborhoods which are "underprivileged" according to accepted present-day standards.. There are about 80 definite "neighborhoods" in Chicago, areas cut off to themselves by natural boundaries such as railroads, boulevards, parks and industrial plants. Some 30 of these are "underprivileged" according to American standards. There is no wholesome, directed recreation available for boys there.

The club wants not only to extend its facilities in many new neighborhoods that need it as badly as those it is already serving, but to complete the work it has

begun in the original neighborhoods. It feels that its work is in vain if it keeps contact with a boy for only two or three years. It should have contact for at least ten years, say, from 6 to 16 or 18, to make its work completely effective

Chicago changes so rapidly that this has been found difficult, if not impossible, up to the present. Entire neighborhoods migrate with such rapidity that five years will see a complete exodus of the old population and the invasion of an entirely new people. A study of neighborhood population movement has been made, however, by W. R. Boorman, director of research of the Boys' Club, who has been able to forecast population trends with sufficient accuracy to afford a basis for the location of the proposed new buildings, so that when a boy moves from one neighborhood to another he will find a Boys' Club there waiting to welcome him and to carry on the influence exerted by the old. Because change from city to country environment is beneficial, the Club maintains a summer camp for members at Winona Lake, Ind.

Each proposed building and grounds will cost about $150,000. It is a part of the Club's plan to raise $200,000 endowment for each building, or a sum equal to about one-half of its support, the balance of the budget in each case to be underwritten by influential interests dominant in the neighborhood.

JOHN H. WITTER
General Superintendent, Chicago Boys' Club.

Firemen Instruct City Watchmen

Los Angeles, Calif.—In an effort to reduce industrial fire losses in this city, Fire Chief R. J. Scott has inaugurated a course in fire-prevention work for watchmen on duty at local business and industrial establishments.

Since watchmen are constantly in close contact with the sources of industrial fires, while at their nightly shifts, the Fire Department undertook to invite various firms to send their men to the Los Angeles Fire College for fire-prevention instruction. The response was astounding, 973 enrolling for the course and many concerns sending their foremen, superintendents or engineers as well as their watchmen. Because of limited space, the men have been divided into classes of 50 each, the separate groups attending the college one afternoon a month.

Six lessons are offered in the course and among the subjects discussed are: operation of municipal fire-alarm boxes; operation of auxiliary fire-alarm systems; emergency use of the automatic telephone; demonstrations of various types of fire extinguishers; demonstrations showing the danger of inflammable dust and dust explosives; demonstrations depicting how electric fires are caused by short circuits and overloads; lectures on fire doors and their use and abuse; use of interior standpipe hose lines; demonstrations of the sprinkler systems, supervised and unsupervised; use of control and drain valves, etc.; the watchman's tour throughout the plant; hazards the watchman may expect to encounter; action to be taken on his tours and methods of procedure in case of an emergency.

As an additional feature, representatives of the Police Department and of the Sheriff's office lecture on means of preventing burglary and of preserving evidence when a burglary occurs. All the lectures are illustrated by slides treating of the subject-matter under consideration. Each man attending is given a key tag containing the Fire Department telephone number for his guidance, should he forget it in case of an emergency. A sample bottle of mercurochrome is also allotted to each watchman for use, if necessary, should he be unable to leave his post when a fire breaks out.

The subject-matter presented at each instruction period is printed in pamphlet form and given to the watchmen at the conclusion of the class for further study and reference. Cards are issued to those attending and punched at each class as a check on attendance. Those who attend every class and take the full course are given a certificate indicating that fact.

S. H. DODD,
First Assistant Fire Chief.

New Central Fire-Alarm System at Sioux City

Sioux City, Iowa.—This city recently installed a new central fire-alarm system that is among the best in the country and very effective.

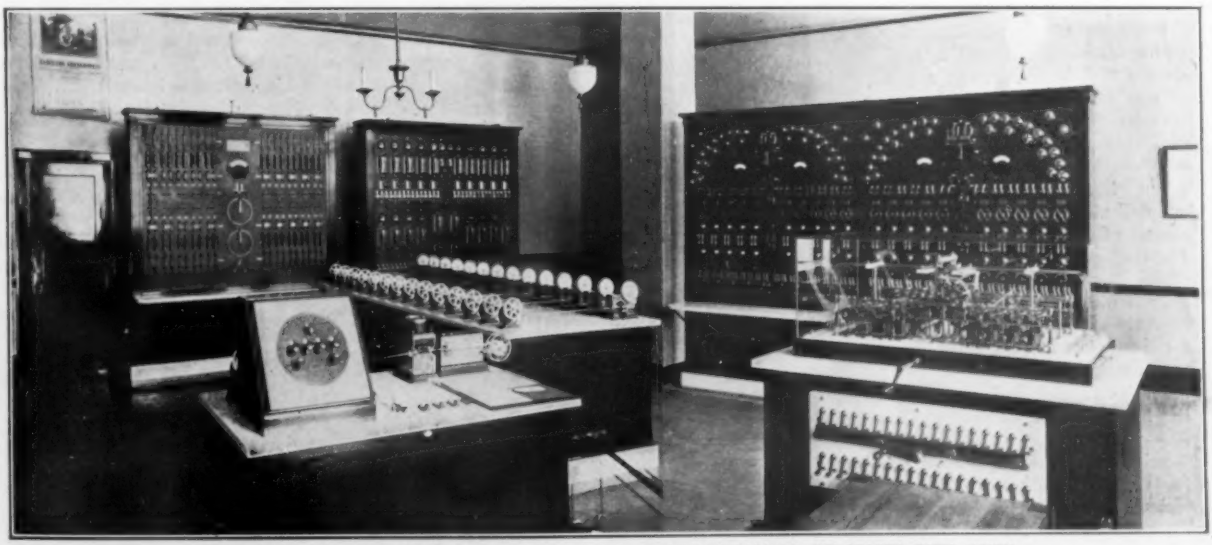
The old system was located in the City Hall, which is not of fire-proof construction. A new headquarters building, which is fire-proof, houses the improved equipment. In addition to the change in the central-office system, 35 new fire-boxes have been set up and the fire-alarm wires in the business district placed in conduits. Since Sioux City has a population of more than 82,000, with a fire area of 44 acres, an extensive fire-alarm system is a prime requisite for proper protection.

Composing the new Gamewell equipment, which is pictured in the accompanying photograph, are the following items: one 20-ckt. protector board; one 20-ckt. box line relay board; two 10-ckt. storage battery switchboards; one 14-ckt. semi-automatic repeater; one marble repeater switching panel; one recording group consisting of 14 open-circuit Ideal registers and 14 Peerless take-up reels; one recording and transmitting set consisting of one 1929 model Peerless transmitter, one 20-ckt. Nonpareil register, one Excelsior time stamp with clock, one Peerless take-up reel, one telegraph key, and four 1-arm two-point switches; one low-current indicating panel; 500 cells F.I.P. battery, and two 60-inch four-shelf metal battery racks.

GEORGE M. KELLOGG,
Fire Chief.

Philadelphia Can Now Proceed with City Planning and Zoning

Philadelphia, Pa.—This city's handicap in the drafting of a reasonable zoning ordinance has been removed by the State Legislature of 1929. Before adjournment this body passed a zoning enabling bill which, with the Governor's signature, now gives Philadelphia permission to adopt comprehensive regulations. Prior authority to zone, granted by the Legislature in



THE CENTRAL FIRE ALARM EQUIPMENT RECENTLY INSTALLED AT SIOUX CITY, IOWA

1915, made no provisions for area control and the appointment of a Board of Adjustment.

The new enabling act is modeled after, and is practically a duplicate of, the Standard State Zoning Enabling Act of the Department of Commerce. In addition, it authorizes a Bureau of Zoning, establishes penalties, and contains a validity section to care for adverse court decisions if such should be rendered against any of its provisions.

While this authority was being granted by the State Legislature at the request of City Council, the councilmanic body enacted a companion piece of legislation creating a city planning commission.

Philadelphia is therefore now in a position to proceed with a planning program at the same time that it drafts a zoning ordinance.

Amendments weakening Philadelphia's housing code, which passed the Legislature, were vetoed by the Governor while the obsolete city building laws were replaced by a comprehensive code which was the result of two and a half years of labor of the Building Code Revision Committee appointed by the Mayor of Philadelphia. This building code was subject to radical revision in the Legislature, no less than 450 different amendments having been made during its passage.

BERNARD J. NEWMAN.

Symphony Orchestra Now Has a Balanced Budget

OKLAHOMA CITY, OKLA.—Few symphony orchestras show a balance in the bank at the close of a season. In fact, it is almost a foregone conclusion that such organizations must everlastingly be found "in the red."

This tradition, however, has been badly upset by the Oklahoma City Symphony Orchestra, which last season kept within a definite budget, raised the money to cover all expenses, and finished the season with a balance in the bank of $121. Five concerts were presented at a total cost of $12,500—$2,500 per concert. The amount was raised by subscription and sale of tickets.

Evidence of the quality of the programs rendered is found in the response to the first letter sent to a selected list of one thousand prospects soliciting reservations for the coming season. A total of $3,948 worth of tickets were sold in response to this first letter.

The budget plan of operation was adopted after three years of financing by means of a $22,500 per year guarantee. For the first two years of this period the deficit was 31 per cent, and for the third year it was 41 per cent. The number of concerts was reduced to five for the season just closed, from seven presented in preceding years.

The average attendance at the concerts has been about 1,000 people, although 2,000—practically a capacity house—heard the closing concert of the season, on March 11. Concerts are held in the Shrine auditorium, for which the Symphony committee pays regular rates.

The committee is anxiously looking forward to the construction of a proposed city auditorium. In such a building, it is pointed out, the concerts could be staged at much lower cost, permitting popular prices and larger attendance. The popular prices, of course, would bring good music within the reach of hundreds of school children and many grown-ups to whom the present prices present an insurmountable barrier.

MRS. FRANK BUTTRAM.

Tennessee's No-Speed-Limit Law

NASHVILLE, TENN.—Tennessee now boasts of a progressive Rules of the Road law. On April 13, 1929, the new law went into effect, which, among other things, removes any definite speed limit, and permits its motorists to drive at any speed so long as they are careful, sober, and considerate of the lives and property of others.

This piece of progressive legislation was sponsored by the Nashville Automobile Club and by the Nashville Chamber of Commerce, and in the main conforms with the general scheme of the so-called Hoover Standard Vehicle Code. It prohibits driving while under the influence of intoxicants, governs stops at railroad crossings, regulates the passing of one vehicle by another, regulates parking on the highways, defines the right-of-way, describes the proper warning devices and lights, and outlines the proper procedure in cases of violation of the act.

The most significant feature of the act, and its greatest difference from the uniform act regulating the operation of vehicles on highways, is that it stipulates no speed limit as prima facie lawful or unlawful. The Standard Act provides a legal speed of 15 miles an hour when approaching within 50 feet of a railroad crossing, when passing schools, at intersections of highways, and when going around curves or traversing a grade where the driver's view is obstructed within a distance of 100 feet; 20 miles an hour in business districts, in residence districts, and in public parks; and 35 miles under all other conditions. The Tennessee law makes no reference to any legal speed limit, but simply states "that it shall be unlawful for any person to drive any vehicle upon a highway carelessly and heedlessly in wilful or wanton disregard of the rights or safety of others, and without due caution and circumspection at a speed and in a manner so as to endanger or be likely to endanger any person or property." As a safety measure, the law prohibits the passing of one vehicle by another when the roadway ahead is not clearly visible within a distance of 300 feet—as on curves or on the crest of hills.

The new law is being praised by motorists in the state as a means by which an end is put to speed-traps and roadside justice maintained and administered by rural justices of the peace and constables. Peace officers can no longer arraign motorists before roadside J. P.'s and fine them for going 31 miles per hour. The law provides that justices of the peace shall try no case of alleged violation except upon a warrant duly prepared in the form required by law, and shall collect no fine or cost until they have completed the entries pertaining to such cases in a docket kept for the making of records, and these shall be preserved and kept open to inspection at all times. The justices are also required to deliver upon request a receipt showing in detail the amount of fine and cost imposed upon and paid by the accused.

J. W. MANNING,
Vanderbilt University.

Why Lose Heart About Proportional Representation?

To the Editor of THE AMERICAN CITY:

It is gratifying to see that Samuel A. Carlson, the distinguished former mayor of Jamestown and former president of the New York State Conference of Mayors, is once again on record, in the May number of THE AMERICAN CITY, in favor of the general principles of Proportional Representation. But in attempting to meet the objections of critics by simplifying the accepted procedure for proportional elections, it seems to me he concedes too much in the way of principle and does so without making the plan one whit more available.

What Mayor Carlson apparently overlooks is the fact that objection to the supposed complexity of Proportional Representation is usually a cloak for other objections of a much more fundamental but less presentable character which no mere simplification in technique could turn aside. The motive power of the opposition to P. R. is almost everywhere an opposition to the very principle of the representation of minorities—and particularly of divided majorities—on the part of those who profit or hope to profit by plurality methods.

In the recent session of the Pennsylvania legislature, for example, the optional city-manager bill for Philadelphia with its Proportional Representation feature was killed by the opposition of the Vare machine. It was killed not because of the additional burden that P. R. would have put on the counting officials—in fact that objection was hardly raised—but because P. R. would obviously have diminished the Vare membership on the Philadelphia council from 100 per cent to something like 50 per cent. In Cleveland the most strenuous and persistent opposition to P. R. comes from politicians of the old school who have been bothered ever since the advent of P. R. by such independent councilmen as Professor A. R. Hatton, the well-known authority on municipal government and charter consultant of the National Municipal League, Peter Witt, the fiery disciple of the late reform mayor, Tom L. Johnson, and Dr. F. W. Walz, who started the recent investigation of land deals which has sent one organization councilman to the penitentiary. In Cincinnati to-day practi-

cally the only opposition to P. R. comes from the notorious Cox-Hynicka-Schneller machine, which it put out of power.

Such opponents will seize on any argument that can be used to hoodwink the unthinking public. Having no more serious charge that can truthfully be made against the standard form of proportional representation, they frequently play up its "complexity," even though all the complexity is in the counting, which has never yet baffled an official counting staff, while the task of the voter is as simple as 1, 2, 3. But against Mayor Carlson's suggestions for a half-hearted approach to P. R. much more serious charges could be urged—and would be urged from the very same motives. For his suggestions are not only distasteful to the spoils politician, but suffer from the real defects which have prevented the spread of other forms of limited and cumulative voting looked to with such hope by reformers a half century ago.

Without exploring the possibilities of his suggestions in detail, it may be pointed out that they contain no guarantee either of majority rule or of the representation of all substantial minorities, and that they make the task of the voter more difficult than it is under the standard form of P. R.

For the election of those members to be chosen at large Mr. Carlson proposes nomination by petition, three votes for each voter (possibly with the right to cumulate), and the election of all candidates who are voted for by more than a certain percentage (say 10 or 20), with extra votes in council or the right to name extra members for those voted for by more than 50 per cent. Let us suppose that a majority group of 55 per cent of the voters supports a slate of three candidates, while the other 45 per cent divide (either artificially or from real differences of opinion) into four groups of slightly over 10 per cent each, each group supporting a separate slate of three. The majority group will of course elect its three and might, if I understand Mr. Carlson correctly, perhaps have the right to appoint three more, making a total of six.* But if the percentage vote required for election is fixed at 10, the four minority groups will elect three each, making a total of twelve. If, on the other hand, the percentage is fixed at 20, they will elect none at all. The plan, though it has most of the advantages Mr. Carlson claims for it, is obviously unscientific and arbitrary and would continually give its opponents good arguments for its abolition.

It may be said that such extreme examples as I have given would be unlikely, because the voters would be guided by the probabilities of each particular situation and would tend to make the best use of their votes by combining or dividing as the occasion might demand. This is true enough, but it is merely another way of saying that to get results the voter would have to exercise the gift of prophecy and submit to organization. His difficulties would be far greater than under the standard form of P. R., under which he need not worry about any candidate's chances of election, but can make his vote most effective by simply marking the figures 1, 2, 3, etc., to indicate his real order of choice.

The good is often the enemy of the best. When the best in election methods has already made so encouraging a start, it would seem the height of folly to lose heart and accept a substitute which spoils politicians would attack as strenuously and which good citizens could not defend.

GEORGE H. HALLETT, JR.,
Executive Secretary, Proportional Representation League.

Philadelphia, Pa., May 10, 1929.

A Rejoinder by Mr. Carlson

To the Editor of THE AMERICAN CITY:

Mr. Hallett very kindly submitted his manuscript replying to my P. R. letter in your May issue (page 122).

Permit me to state briefly that my plan would give each voter the right to vote for three candidate or cast all three votes for one candidate for membership in a governing body, with a proviso that all candidates who receive more than 10 per cent of the total community vote should be declared elected regardless of the number receiving such percentage of the vote. I have also suggested, in justice to the majority element of the city as a whole, that all candidates who receive 50 per cena of the vote be given two votes in the Council, similarly as in the New York City Board of Estimate, or the option to select one additional representative to represent the majority group; and all candidates who receive 75 per cent or more of the total vote be accorded the right to cast three votes or appoint two representatives to represent the proportionate strength of the majority vote over that of all other combined groups. This, it seems to me, carries out the real spirit of the P. R. principle, as well as the fundamentals of democracy

SAMUEL A. CARLSON.

Jamestown, N. Y., May 13, 1929

Expenditures for Education Increase Rapidly

THE phenomenal increase in expenditures for education, from $781,707,000 in 1913-14 to about $2,744,000,000 in 1925-26, is revealed in information obtained in a nation-wide inquiry of more than a year by the National Bureau of Economic Research, which has recently been published in the report of the Committee on Recent Economic Changes of the President's Unemployment Conference. The Committee, with President Hoover as Chairman, is made up of business and labor leaders and economists. The data relating to education were gathered by the National Bureau's section on "Changes in Consumption and the Standard of Living," under the direction of Dr. Leo Wolman.

Rouphly, $2,500,000,000 of the total spent on private and public education in 1925-6 represents free education, the survey data show. In that year universities and professional schools spent $407,400,000, of which $101,499,000 was returned to them in the form of tuition fees. Of the $190,589,000 spent by private, elementary and high schools, it is estimated that from a third to a fourth was not covered by tuition receipts.

The per capita expenditure in 1926 for pupils in the public elementary schools was $63.31; in public high schools, $195.74; and in universities and colleges, $423.

Total expenditures increased by 250 per cent between 1913-14 and 1925-26. Almost half of this increase was for free elementary schools. At the same time enrollment in elementary schools rose from 17,934,000 in 1913-14 to 20,984,000 in 1925-26, or about 17 per cent.

One item in the rapid increase in the total expenditures of recent years has been the increase in the amount expended for grounds, and buildings and contents. Annual capital outlay per pupil in average daily attendance amounted only to $7 from 1916 to 1918; by 1925 this amount had increased to $21.86, and in 1926 it stood at $20.47.

The striking increase in expenditure for education, according to investigators, took place in the appropriations for public high school education. These increased tenfold from $68,911,000 in 1913-14 to $697,912,000 in 1925-26, while the total enrollment increased by more than 200 per cent, that is, from 1,218,000 to 3,757,000.

The number of college and university students likewise grew with great rapidity from 325,219 to 822,985 during the same period. It is estimated that expenditure for free college and university education increased in little more than a decade by nearly 350 per cent.

Figures show a big jump in expenditures after 1918. For public elementary schools, including kindergartens, $599,383,000 was expended, while in 1921-22 expenditures mounted to $1,163,374,000; in 1925-26 they had increased to $1,328,396,000. Public high school expenditures jumped from $162,876,000 in 1917-18 to $417,297,000 in 1921-22, reaching $697,912,000 in 1925-26. For universities, colleges, and professional schools the figures are: $137,055,000 for 1917-18, $272,815,000 for 1921-22, and $407,400,000 in 1925-26.

The conclusions and recommendations of the Committee, as well as the survey data, are issued in two volumes.*

* Published by the McGraw-Hill Company, New York; price, $7.50.

* Mr. Carlson's comment on this sentence is as follows: "The majority group could either vote three more votes or elect three more representatives under the situation to which you referred. It could not elect any additional representatives or cast any more votes unless the combined vote gave it a proportionate percentage in excess of the combined minority groups."

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Aqueducts Built on Rough Topography

By COL. F. F. LONGLEY

LYING on the east side of San Francisco Bay, opposite the Golden Gate, there are nine municipalities, of which the principal ones are Oakland and Berkeley. Geographically these cities form one large community, although they are separated by political boundary lines. They have for a long time been served by a private water company, well known to water-works engineers as the East Bay Water Co., supplying about 550,000 people.

Within recent years a sentiment has developed in the East Bay cities in favor of water-works ownership by the people, especially in view of the impending need for large additions to the supply, which could be best obtained from the Sierra Mountains about 100 miles further east. Such a project would of course involve large capital expenditures. As a result, the East Bay Municipal Utility District was created under an act of the State Legislature, and this new organization has proceeded to build the wonderful Mokelumne system and has acquired the properties of the East Bay Water Co.

Sequoia and Wildcat Aqueducts

To bring the water from the east to the group of cities around the bay, the coast range had to be pierced by a tunnel. The westerly portal of this tunnel lies on high ground just above the cities of Oakland and Berkeley. From this portal two main distributing aqueducts were required, one running north and one south, to connect with certain of the service reservoirs and with the large mains of the existing or expanding system.

These two aqueducts, called the Sequoia and the Wildcat aqueducts, are for vital service. It was essential to assure safety and regular and unfailing delivery. There must be no weaknesses of a sort which might result in a rupture of the pipe line and flooding of streets and structures, or in damaging leaks which might be troublesome under the pavement. High carrying capacity, well sustained as the pipe line grew older, was of great importance. Construction must be economical, and trouble and expense of maintenance eliminated to the greatest possible degree.

Streets through which the pipe line was to be built were many of them narrow, lined with industrial establishments and crowded with heavy traffic. Busy squares were to be crossed, with electric car lines on the surface and endless numbers of sewers, pipes, conduits and other underground structures to get around. Curves, both horizontal and vertical, were met at frequent intervals, and many branches, blow-offs and connections to existing lines. Several large special branches had to be built differing radically from many standards, and it was necessary to complete the construction work in such a way that the paving would be promptly and permanently restored.

Type of Pipe Selected

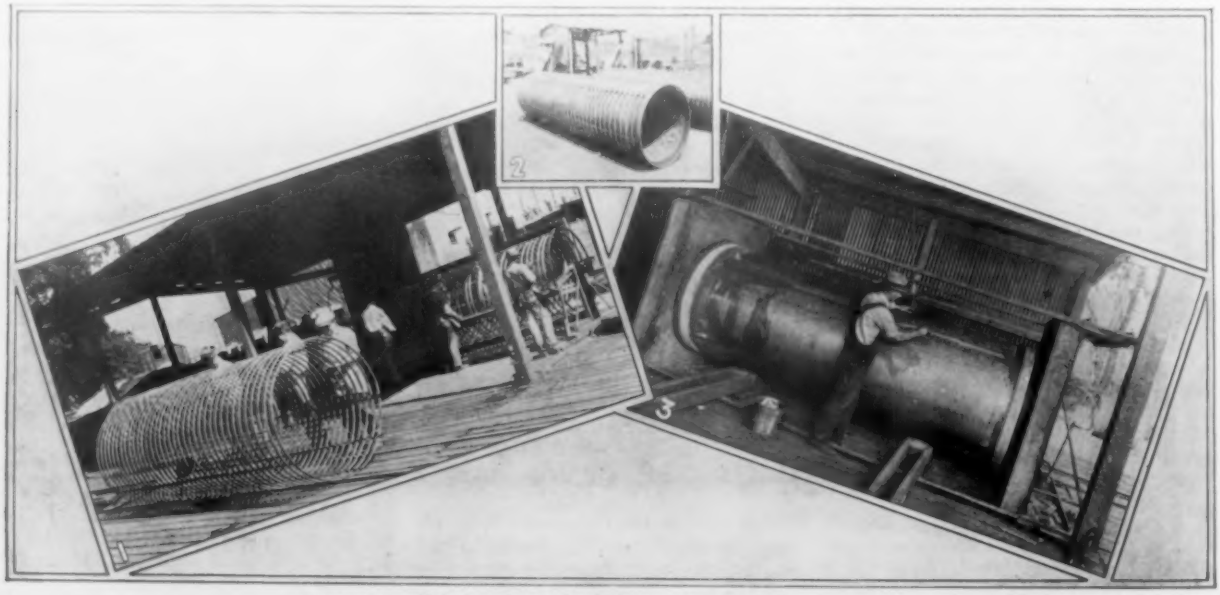
Lock Joint steel cylinder reinforced concrete pipe was selected for these pipe lines as best meeting all the requirements. Its strength, rugged construction, high carrying capacity, joint tightness and flexibility, long life and absence of corrosion, are advantages which the engineers desired.

The total length of the two aqueducts is about ten miles, of which eight miles is 48-inch and two miles 54-inch pipe. This line is built for a test pressure of 130 pounds per square inch.

Making the Pipe Locally

A manufacturing site was acquired lying close to the main line of the Southern Pacific Railway in Berkeley, and a plant was set up for the manufacture of the pipe. Practically all of the materials for the work were obtained locally.

Pipe of this type is in reality a steel pipe completely lined and encased in reinforced concrete. The completed steel structure is shown in one of the illustrations. A welded steel pipe is first built in 12-foot lengths, and joint rings of special section are welded to the ends, and then the reinforcing steel is assembled inside and outside the steel pipe. Every part of the steel structure is tested before it is built into the pipe. The welded steel cylinders are tested un-



FABRICATING THE STEEL STRUCTURE OF THE AQUEDUCT PIPE
1. Making the bar cages. 2. The completed steel structure of the pipe. 3. Testing the finished steel cylinder

POURING AND LAYING THE STEEL CYLINDER REINFORCED CONCRETE AQUEDUCT PIPE
1. The manufacturing and storage yard at Berkeley. 2. Laying the pipe and backfilling. 3. Compacting the backfill

der an air pressure of 25 pounds, and all the other welds are effectively tested; the circumferential hoops to about 18,000 pounds per square inch, and the joint rings to the elastic limit. The fabrication and testing of the steel structure is shown in some of the illustrations.

The finished steel structure contains all the elements of watertightness and of strength to resist internal pressure before any concrete is placed around it. The concrete serves the useful purpose of covering the steel structure with a protective covering, and it also furnishes a wall material strong in compression to take the stresses of external loading.

The concrete was made with washed sand and gravel, obtained near Oakland, and proportioned 1:1-½:2½. The daily production averaged something over 300 lineal feet of finished pipe.

Construction of Line

The construction of the line was unusually difficult because of the extremely rough topography of the region and the fact that streets on the hillside slopes have been laid out to take advantage locally of easy grades for traffic, but with no regard for straightness or continuity from the point of view of location of a pipe line. This resulted in an unusually large number of sharp angles and of steep slopes, cuts across private property, and frequent variations of trench depth. There were also the usual difficulties of rock excavation, pavements, and innumerable services and pipe lines to be taken care of. Many bends and specials were required in the construction of the aqueducts, and one of these specials is shown in one of the illustrations.

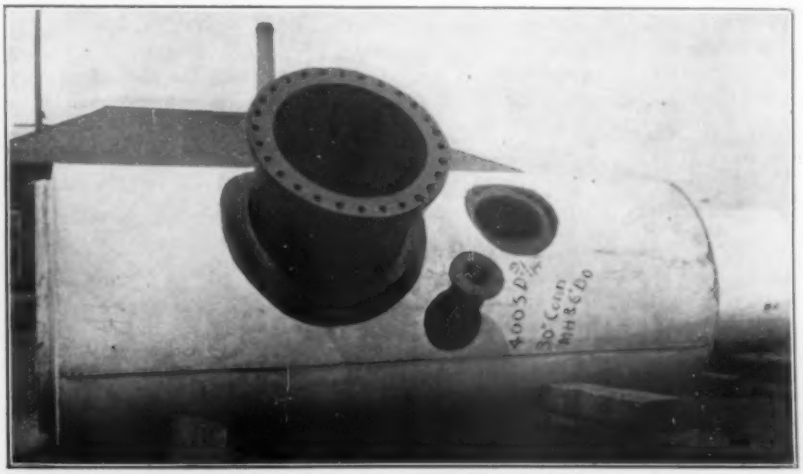
Within only a few feet from the point where the Wildcat aqueduct leads away from the westerly portal of Claremont tunnel, it meets another hill and goes through it in tunnel. This has a length of slightly under a thousand feet. On the original plans it was shown with a lining of 7/16-inch steel plate completely surrounded and backed up to the rock surface with concrete. The contractor, with the approval of the Board, elected to line this tunnel with steel cylinder reinforced concrete pipe of the same type as in the rest of the aqueduct.

After the tunnel excavation was completed, the pipe was carried in and laid to grade. It was then surrounded with concrete by means of a concrete gun. The finishing of the joints was a simple matter, because it was done entirely from the inside of the pipe.

Trench Excavation

The trench excavation was done with machines of the hoe digger type. These can be seen in one of the illustrations. The material to be removed consisted of both earth and rock, and the specifications provided that where the bottom of the trench was in rock it should be excavated until no rock projected within three inches of the established subgrade line, and suitable earth was then to be placed in the trench and thoroughly tamped to form a suitable bedding for the pipe. In some parts of the line the excavation was almost all rock.

As practically all of the ten miles of pipe line was laid through city streets, altogether too narrow to permit the excavated material to be stored alongside the ditch, motor trucks were used to take the material from the digger. Rock was hauled away to the dump. Excess earth not required for backfilling was likewise hauled away. Earth required for backfilling was moved at once by the truck along the trench and dumped



AN UNUSUAL CONCRETE PIPE SPECIAL USED BY THE EAST BAY UTILITIES DISTRICT

LOWEST BIDS ON VARIOUS PIPE FOR THE AQUEDUCTS

	Sequoia Aqueduct	Wildcat Aqueduct	Both
Steel cylinder reinforced concrete pipe	$587,529.00	$839,525.00	$1,427,054.00
Steel pipe	590,496.00	822,989.00	1,413,485.00
Cast iron pipe	849,671.00	1,145,238.00	1,994,909.99

around and over the pipe which had just been laid. The illustrations show how closely the backfilling followed upon the laying of the pipe in the ground. This was made possible by the fact that the work of making the joint tight and finishing it was done entirely from the inside of the pipe.

Backfilling underneath and around the pipe was done by means of air tampers. The compacting was done very thoroughly with a view to eliminating, as much as possible, the chances of settlement, and the paving was reconstructed over the backfilled ditch closely following the backfilling.

The same machine which did the digging lifted and supported the pipe in process of laying it in the trench.

Costs

Bids for this work were taken on cast iron pipe, steel pipe, and steel cylinder reinforced concrete pipe. The lowest bids received upon each of these three kinds of pipe for the two aqueducts are shown above.

The lowest bid as received on the Wildcat aqueduct was for steel pipe, with steel cylinder concrete pipe next. The lowest bid on the Sequoia aqueduct was for steel cylinder concrete pipe, with steel pipe next. Considering the two aqueducts as one job, the lowest bid was on steel pipe, approximately $14,000 lower than for steel cylinder concrete pipe An alternate provision offered by the low bidders on steel, if accepted by the Board, would have made the low bid on steel pipe about $60,000 lower than on steel cylinder reinforced concrete pipe.

The contract was awarded to Lock Joint steel cylinder reinforced concrete pipe, as the engineers estimated that the physical advantages of that type of construction gave it sufficiently greater value to overcome the differences in bids.

The schedule of lengths and diameters of pipe, as shown in the original contract drawings, was as follows:

Diameter	Linear Feet
60-inch	11,660
56-inch	39,161
50-inch	1,131
Total	51,952

After the contract was awarded, the Board decided to reduce the pipe sizes, thus making a practical application of the greater value credited on account of high carrying capacity to the concrete pipe line. The revised schedule of lengths and diameters to which the aqueducts were actually built, is as follows:

Diameter	Linear Feet
54-inch	11,660
48-inch	40,292

This change in diameters resulted in a reduction in the cost of the two pipe lines of about $95,000. This was a positive saving to the District and resulted in the actual cost of the Lock Joint pipe line being substantially less than the lowest bid received.

Notwithstanding the many difficulties of this work, the Sequoia aqueduct was completed and tested and accepted by the District within the specified time limit, and progress on the Wildcat aqueduct promises that that, too, will be completed within the specified time limit.

Personnel

The Sequoia and Wildcat aqueducts are being built under the direction of the East Bay Municipal Utility District, of which Arthur P. Davis is General Manager and Chief Engineer, Frank W. Hanna, Hydraulic and Designing Engineer, and James Munn, Construction Engineer. The work is being done by the Lock Joint Pipe Co., under the direction of W. W. Trickey, General Superintendent.

Colorado Adopts City-Planning Enabling Act

ONE of the most modern city-planning laws in the United States was enacted by the Colorado legislature just before it adjourned, April 21; it was signed by Governor William H. Adams on May 21.

The bill as passed embodies the Hoover city-planning enabling act, produced by a committee under Herbert Hoover while he was Secretary of Commerce. With the exception of a few changes in the section relative to subdivision control and minor changes in the bill in a few places to make it conform with Colorado legal practices, the act as passed follows the Hoover act word for word.

Under the new law all Colorado cities will have the right to establish city planning commissions. Previously only home-rule-charter cities in the state had this right and there was no real legal basis for city planning, which was being carried forward vigorously only in Denver, with a start having been made in the smaller cities of Boulder, Fort Collins and Grand Junction.

The law also sets up a procedure and authorizes the establishment of regional planning commissions. This section has been absolutely unchanged from that of the Hoover model act. Denver is prepared to initiate a comprehensive regional planning program with the smaller suburban towns that fringe the city cooperating.

The scope of the Hoover bill on subdivision control is somewhat reduced in the Colorado law. The law provides for subdivision control by planning commissions within a three-mile radius from the city limits. This subdivision control is purely contingent on a major street plan for the suburban district. The original Hoover act gave subdivision control relative to all phases of the city plan and in addition gave powers to impose control as to the minimum size of lots and also as to the extent of improvements installed. Colorado city planners felt that such extensive control beyond the city limits was unwise at this time, due to the fact that city planning in this state has not yet been fully impressed on the public mind. However, the Colorado law gives subdivision control within city limits with regard to all phases of the city plan and also as to the minimum size of lots.

The law also gives a means of imposing building-line setbacks under the Massachusetts plan of the use of eminent domain in the control of buildings in the bed of mapped streets. Again in this section the Colorado law follows the Hoover bill almost word for word.

The bill was introduced in the Colorado legislature at the instance of the Denver Planning Commission and the efforts of this body, supported by the Denver city administration, were responsible for its passage. Work on the bill to see that it conformed with Colorado procedure was done by George Hetherington, assistant to the City Attorney of Denver.

When the law becomes effective, 90 days after signing, it is expected that city planning in the state will receive a great stimulus. More than a dozen cities will institute city-planning programs.

A Comprehensive Index to the Latest Engineering Literature

THE most comprehensive effort yet made to bring together the complete body of current engineering literature is represented by the Engineering Index Service first instituted in January, 1928. The contents of THE AMERICAN CITY are indexed as soon as the issue appears each month in a set of cards which bring conveniently to the user references to any material covered in the magazine, or in any of 1,700 other journals in all languages.

The Engineering Index Service, because of its vast scope, is expensive. The complete subscription price is $2,000. In spite of this fact, a number of public libraries have provided it for use by their readers. These include Newark, N. J.; Cleveland, Ohio; Bridgeport, Conn.; Baltimore, Md.; and the John Crerar Library, Chicago. Because of the unavailibility of the work elsewhere in New York City, the Engineering Societies Library, 27 West 39th Street, has opened the use of the Index to the public from 9 a. m. to 5 p. m. daily.

A Survey of Water-Meter Rates in the United States—Part I.

THERE can be no better introduction to a survey of water-meter rates than abstracts from the classic "Meter Rates for Water Works," by Allen Hazen, published by John Wiley & Sons, Inc. The following paragraphs are from this book, which should be studied by every man working on a new or revising a meter schedule:

There are two reasons for the use of water meters. The first is that selling water by measurement is the only logical and fair way of conducting the business. It is the only way that does not result in gross inequalities and discriminations against some of the takers and in favor of others. The second reason is that metering water is the only practical method yet found for restricting excessive waste.

With some kinds of meter rates the time interval is not stated, but many of them are expressed in amounts of water drawn within a certain time interval. The periods used are the day, the month, the quarter, the half-year and the year.

It takes a good degree of mastery of the English language to express all the ideas to be incorporated in a water-rate schedule in terms of unmistakable clearness and at the same time to be concise. In some existing schedules clearness has been sacrificed to conciseness with the result that the expression is ambiguous. Those who draw the rates in the first place know what they intend and the local interpretation is correct. It is therefore seldom that local misunderstanding results. But there are some rates now in use so drawn that an outsider cannot tell with certainty how they are interpreted and what the bills for certain quantities should be. The commonest uncertainty is as to whether the rates should be classified under the jump scale or the sliding scale.

There is often a temptation to conclude that a particular set of rates is too high or too low because it is above or below the general average or above or below rates in some other system selected for comparison. A fair judgment of water-rates cannot be reached in this way. It costs far more to collect, treat, pump, carry, store and distribute water in some cases than in others. A two-to-one ratio in actual water costs when compared on the same basis is not uncommon between neighboring systems, and in extreme cases much wider ratios are found. But the methods of distribution of the total charge that is otherwise found to be fair among the different classes of takers may well be standardized.

The rates that produce equal revenues are as follows:

Uniform rate without service charge or minimum, 29.03 cents per 1,000 gallons.

Uniform rate with service charge, $5 and 20 cents per 1,000 gallons.

Uniform rate with minimum rate, $8 and 25.85 cents per 1,000 gallons.

Definitions

Meter Rent.—In some works a charge is made for the rent of meters furnished and owned by the department. Where such a charge is made, it is in reality a service charge and it must be so classified. The service charge as now used ordinarily covers meter rent and much more, so that the meter rent represents only a fraction of the amount of what may be considered the normal service charge. Cases may be found where meter rents are used in connection with a minimum rate, but with this minor exception the service charge is not used in connection with a minimum rate.

Minimum Rate.—A minimum rate is an amount that is collected in any event, even though the price of the quantity of water registered by the meter does not amount to it.

Service Charge.—A service charge is a charge for the service, which is in addition to the amount that is charged for water.

Modified Service Charge.—Under this form there is a minimum charge for a certain quantity of water, and the amount of the minimum is made up of what would otherwise be the service charge and the meter rate for that quantity of water that is furnished for the minimum charge.

Uniform Rate.—A rate per thousand gallons or per hundred cubic feet that is charged uniformly for all quantities of water sold.

Jump Scale.—The quantities of water up to a certain limit are charged at a certain price; beyond that limit and inside another limit another and lower price is made, and beyond that there is another limit and another price, and so on. In some cases two prices only are used; in others three, four or more, up to a dozen or twenty and, in fact, divisions may be so numerous that the scale practically becomes a table which gives the water rate for every quantity of water that a meter records.

Modified Jump Scale.—Under this arrangement each step in the jump scale is subdivided into two parts, the second of which comprises all those quantities for which it would be possible to get a lower rate by drawing more water. For these quantities a lump sum collection is made, which sum is the minimum that could be obtained under the next step. For the first part of each step the rate remains as with the jump schedule.

Sliding Scale.—Under this arrangement the water first drawn up to a certain limit is charged at a certain rate. Additional quantities are charged at a lower rate, but the higher charge on the first quantity remains as part of the bill in all cases.

The meter rates below are from original reports furnished to THE AMERICAN CITY for publication in the Water-Supply Statistics of American Municipalities published as Section 9 of the 1929 MUNICIPAL INDEX. The figure given immediately after the name of the city is the population served by the waterworks.

ALABAMA

Albertville, 2,000

Gals. per Quarter	Gals. per Mo.	Rate per 1,000 gals.
First 12,000	4,000	50¢
Next 18,000	6,000	40¢
" 45,000	15,000	30¢
" 75,000	25,000	25¢
" 150,000	50,000	20¢
" 300,000	100,000	15¢
" 300,000	100,000	10¢
Over 900,000	300,000	7½¢

Minimum Charges

Size of Meter	Per Month	Per Quarter
¾" or smaller	$ 1.50	$4.50
1"	2.00	6.00
1½"	3.00	9.00
2"	10.00	30.00

Anniston, 30,300. (Includes Blue Mountain, Camp McClellan and Oxford.)

Cu. Ft. per Quarter	Cu. Ft. per Mo.	Rate per 100 Cu. Ft.
First 3,000	1,000	25¢
Next 3,000	1,000	20¢
" 9,000	3,000	15¢
" 30,000	10,000	10¢
" 60,000	20,000	8¢
" 75,000	25,000	6¢
Over 180,000	60,000	5¢

Minimum Charges

Size of Meter	Per Month	Per Quarter
⅝" with 1 fixture	$ 0.90	$ 2.70
⅝" with more than 1 fixture	1.33	4.00
¾"	2.00	6.00
1"	3.00	9.00
1½"	4.17	12.50
2"	8.33	25.00
3"	12.50	37.50
4"	33.33	100.00
6"	83.33	250.00

Attalla, 4,500.

Gals. per Quarter	Gals. per Mo.	Rate per 1,000 Gals.
First 15,000	5,000	50¢
Next 15,000	5,000	40¢
" 30,000	10,000	30¢
" 90,000	30,000	25¢
" 450,000	150,000	20¢
" 450,000	150,000	15¢
" 450,000	150,000	12¢
" 300,000	100,000	10¢
Over 1,800,000	600,000	8¢

Minimum Charges

Size of Meter	Per Month	Per Quarter
⅝" with 1 fixture	$ 1.25	$ 3.75
⅝" with more than 1 fixture	1.75	5.25

ALABAMA (Continued)

¾″	2.50	7.50
1″	3.00	9.00
1½″	5.33	16.00
2″	12.00	36.00
3″	20.00	60.00
4″	50.00	150.00
6″	125.00	375.00

Bessemer, 50,000. (Includes Brighton, Dolomite, Jonesboro, Lipscomb and Woodward.)

Gals. per Quarter	Gals. per Mo.	Rate per 1,000 Gals.
First 75,000	25,000	27½¢
Next 75,000	25,000	25¢
" 300,000	100,000	20¢
" 450,000	150,000	15¢
" 450,000	150,000	10¢
Over 1,350,000	450,000	8¢

Minimum Charges
Quarterly Charges for ⅝″ Meters

Rooms	1 Fix.	2 Fix.	3 Fix.	4 Fix. or More
3	$2.00	$3.25	$4.25	$4.50
4	2.40	3.60	4.50	4.50
5	2.75	4.00	4.50	4.50
6	3.10	4.50	4.50	4.50
7	3.50	4.50	4.50	4.50
8	3.85	4.50	4.50	4.50
9	4.25	4.50	4.50	4.50
10 or more	4.50	4.50	4.50	4.50

Quarterly Charges for Meters over ⅝″

Size of Meter	Per Month	Per Quarter
¾″	$ 1.50	$ 4.50
1″	2.00	6.00
1½″	3.00	9.00
2″	4.17	12.50
3″	8.33	25.00
4″	16.67	50.00
6″	83.33	250.00

Boaz, 1,600

Gals. per Quarter	Gals. per Mo.	Rate per 1,000 Gals.
First 12,000	4,000	50¢
Next 18,000	6,000	40¢
" 45,000	15,000	30¢
" 75,000	25,000	25¢
" 150,000	50,000	20¢
" 300,000	100,000	15¢
" 300,000	100,000	10¢
Over 900,000	300,000	7½¢

Minimum Charges

Size of Meter	Per Month	Per Quarter
¾″ or smaller	$ 1.50	$ 4.50
1″	2.00	6.00
1½″	3.00	9.00
2″	10.00	30.00

Bridgeport, 2,200.

Retail Meter Rates

Gals. per Month	Rate per 1,000 Gals.
First 5,000	50¢
Next 5,000	45¢
" 5,000	40¢
" 5,000	35¢
" 5,000	30¢
" 5,000	25¢
" 5,000	20¢
Over 35,000	15¢

Retail Minimum Rates

Size of Meter	Per Month
⅝″	$ 1.25
¾″	2.50
1″	4.75
1½″	10.00
2″	20.00
3″	40.00
4″	75.00

Wholesale Meter Rates

All water	$0.15 per 1,000 gals.
Min. for 1″ or smaller meter	5.25 per month
Minimum for larger meters	Same as above

Clanton, 2,100.

Gals. per Month	Rate per 1,000 Gals.
First 1,000	$1.25
Next 19,000	.40
" 30,000	.25
" 50,000	.20
" 100,000	.15
" 300,000	.12
Over 500,000	.10

Collinsville, 1,200.

Gals. per Month	Rate per 1,000 Gals.
First 2,000	75¢
Next 8,000	50¢
" 15,000	40¢
" 25,000	30¢
" 50,000	25¢
" 50,000	20¢
Over 150,000	15¢

Minimum Charges
Residences

⅝″ meter serving house with three rooms or less and having not more than one fixture $1.50 per mo.
⅝″ meter serving house with more than three rooms and or having two or more fixtures $2.00 per mo.

Business Places

Size of Meter	Rate per Quarter
¾″	$ 3.00
1″	4.00
1½″	5.00
2″	12.50
3″	25.00
4″	50.00
6″	200.00

Cordova, 3,000.

Gals. per Month	Rate per 1,000 Gals.
First 10,000	50¢
Next 10,000	40¢
" 30,000	30¢
" 100,000	25¢
" 150,000	20¢
" 150,000	15¢
Over 450,000	10¢

Minimum charge of $2 per month on ⅝″ meters. Larger meters in proportion.

Dadeville, 2,500.

Minimum Charges
(allowing 5,000 Gals.)

Size of Meter	Rate
¾″	$ 2.00
1″	2.00
1½″	4.00
2″	6.00
4″ to 6″	12.00

Minimum of $1.50, allowing 2,000 gals., for residences with only one fixture.

Gallons	Rate per 1,000 Gals.
Next 5,000	40¢
" 10,000	30¢
" 10,000	25¢
" 20,000	20¢
" 25,000	15¢
" 25,000	12½¢

Industries using over 100,000 gals., 15¢ per 100,000 gals.

Decatur and Albany, 17,500.

Gals. per Quarter	Gals. per Mo.	Rate per 1,000 Gals.
First 12,000	4,000	50¢
Next 18,000	6,000	40¢
" 30,000	10,000	30¢
" 90,000	30,000	25¢
" 300,000	100,000	20¢
" 450,000	150,000	15¢
" 450,000	150,000	10¢
Over 1,350,000	450,000	7½¢

Minimum Charges

Size of Meter	Per Month	Per Quarter
⅝″ with 1 fixture	$ 1.10	$ 3.30
⅝″ with more than 1 fixture	1.60	4.80
¾″	2.50	7.50
1″	3.00	9.00
1½″	4.00	12.00
2″	8.33	25.00
3″	12.50	37.50
4″	33.33	100.00
6″	83.33	250.00

Dora, 1,200.

	Rate per 1,000 Gals.
All water for all consumers except ice plant and railroad	50¢
Ice plant and railroad:	
First 100,000 gals. per month	12½¢
Over 100,000 gals. per month	10¢

Minimum Charges

	Per Month
Residences	$2.00
Business houses, schools, depots, etc.	3.00
Railroad and ice plant	50.00

Fort Payne, 3,500. (Also serves Collbran, Lebanon, Portersville, Dawson, Crossville, Painter, Center, Cloudland, Leesburg, Menlo, Mentone, Nightingale and Valley Head.)

Gals. per Month	Rate per 1,000 Gals.
First 5,000	40¢
Next 15,000	30¢
" 30,000	25¢
" 150,000	20¢
" 150,000	15¢
" 150,000	12¢
" 100,000	10¢
Over 600,000	8¢

Minimum Charges

Size of Meter	Per Month
⅝″ with 1 fixture	$ 1.00
⅝″ with more than 1 fixture	1.50
¾″	2.50
1″	3.00
1½″	6.00
2″	12.00
3″	50.00
4″	100.00
6″	150.00

This schedule is not applicable to hosiery mill and railroad, which are served under special contracts.

Gadsden, 30,000. (Includes Alabama City.)

For consumers using less than 10,000 cu. ft. per month.

Cu. Ft. per Month	Rate per 100 Cu. Ft.
200 or less	75¢
Next 4,800	25¢
Over 5,000	15¢

For consumers using more than 10,000 cu. ft. per month.

Cu. Ft. per Month	Rate per 100 Cu. Ft.
First 10,000	12¢
Next 10,000	10¢
" 10,000	9¢
" 10,000	8¢
" 10,000	7¢
" 10,000	6¢
Over 60,000	5¢

Girard, 12,000. (Includes Phoenix City.)

Gals. per Quarter	Gals. Per Month	Rate per 1,000 Gals.
First 30,000	10,000	30¢
Next 30,000	10,000	25¢
" 90,000	30,000	20¢
" 300,000	100,000	15¢
" 450,000	150,000	10¢
Over 900,000	300,000	8¢

Minimum to all consumers, $1.00 per month.

Greensboro, 1,500. (And Newbern.)

For 1 fixture in places not provided for below	$1.50 monthly minimum, allowing 3,000 gals. at 50¢ per 1,000 gals.
For 2, 3 or 4 fixtures not provided for below	$2.00 monthly minimum, allowing 4,000 gals. at 50¢ per 1,000 gals.
For 5 or more fixtures not provided for below	$2.50 monthly minimum, allowing 5,000 gals. at 50¢ per 1,000 gals.
For barber shops, restaurants, hotels, boarding-houses, drug stores, garages, livery stables, court-houses, jails, schools, railroad depots, and all kinds of manufacturing establishments	$3.00 monthly minimum, allowing 6,000 gals. at 50¢ per 1,000 gals.

For all water used in excess of that allowed for minimum.

Gals. per month	Rate per 1,000 Gals.
Next 6,000	40¢
" 15,000	30¢
" 25,000	20¢
" 50,000	10¢
Over	7½¢

25¢ per 1,000 gals. for all water used by city in excess of that allowed for minimum.

Irondale, 1,000.

Gals. per Month	Rate per 1,000 Gals.
First 2,000	75¢
Next 8,000	50¢
" 15,000	40¢
" 25,000	30¢
" 50,000	25¢
" 50,000	20¢
Over 150,000	15¢

Monthly minimum to all consumers, $1.50.

Jasper, 5,000.

Gals. per Quarter	Gals. per Mo.	Rate per 1,000 Gals.
First 18,000	6,000	50¢
Next 12,000	4,000	40¢
" 30,000	10,000	30¢
" 90,000	30,000	25¢
" 300,000	100,000	20¢
" 450,000	150,000	15¢
" 450,000	150,000	10¢
Over 1,350,000	450,000	7½¢

Minimum Charges

Size of Meter	Per Month	Per Quarter
⅝″ with less than 3 fix.	$ 1.50	$ 4.50
⅝″ with 3 or more fix.	2.00	6.00
¾″	2.50	7.50
1″	3.00	9.00
1½″	4.00	16.00
2″	12.50	37.50
3″	20.00	60.00
4″	50.00	150.00
6″	125.00	375.00

Leeds, 2,500.

Gals. per Month	Rate per 1,000 Gals.
First 3,000	66⅔¢
Next 7,000	50¢
" 15,000	40¢
" 25,000	30¢
" 25,000	25¢
" 25,000	20¢
" 100,000	15¢
" 100,000	10¢
Over 300,000	7½¢

Minimum Charges

	Per Mo.
Houses occupied by one family, and other places not mentioned below	$2.00
Barber shops, cafes, restaurants, lunch stands, hotels, boarding-houses, drug stores, garages, livery or sale stables, depots, bottling-works, filling-stations and schools	3.00

Manufacturing establishments:

Size of meter	
¾″	3.00
1″	4.00
1½″	5.00
2″	12.50
3″	25.00
4″	33.33
6″	83.33

Mobile, 70,000.

Minimum Charges

Gals. per Month	Rates per House
3,750	$0.93
4,000	1.00

ALABAMA (Continued)

4,500	1.12
5,000	1.25
5,001 to 15,000	$0.25 per 1,000
15,001 to 17,040	3.75 minimum
17,040 to 25,000	0.22 per 1,000
25,001 to 30,555	5.50 minimum
30,555 to 50,000	0.18 per 1,000
50,001 to 56,250	9.00 minimum
56,250 and over	0.16 per 1,000

Oneonta, 1,500.

Gals. per Month	Rate per 1,000 Gals.
First 4,000	50¢
Next 6,000	40¢
" 15,000	30¢
" 25,000	25¢
" 50,000	20¢
" 100,000	15¢
" 100,000	10¢
Over 300,000	7½¢

Minimum Charges

Size of Meter	Per Month
¾" or less	$2.00
1"	2.75
1½"	3.25
2"	10.00

Barber shops, cafes, restaurants, hotels, public boarding-houses, drug stores, garages, livery or sale stables, court-houses, jails, schools and all manufacturing establishments which are served or could be served through a meter smaller than 1" 3.00

Opelika, 6,196.

Gals.	Rate per 1,000 Gals.	Bill
First 10,000	40¢	$4.00
Next 10,000	30¢	3.00
" 10,000	25¢	2.50
" 20,000	20¢	4.00
" 25,000	15¢	3.75
" 25,000	12½¢	3.12
100,000		$20.37
Next 400,000	11¢	44.00
500,000		64.37
1,000,000	11.43¢	
2,000,000	10.76¢	
3,000,000	10.48¢	

Minimum Charges

Size of Meter	Per Month
⅝"	$ 1.00
¾"	1.00
1"	2.00
1½"	4.00
2"	6.00
4"	12.00

Prichard, 7,500.

Gals. per Month	Rate per 1,000 Gals.
First 10,000	50¢
Next 10,000	40¢
" 30,000	30¢
" 100,000	25¢
" 150,000	20¢
" 150,000	15¢
Over 400,000	10¢

Minimum Charges

Size of Meter	Per Month
⅝" with 1 fixture	$ 1.50
¾"	3.00
1"	4.00
1½"	5.00
2"	12.50
3"	25.00
4"	33.33
6"	83.33

Russellville, 2,500.

Gals. per Month	Rate per 1,000 Gals.
First 10,000	50¢
Next 10,000	40¢
" 30,000	30¢
" 100,000	25¢
" 150,000	20¢
" 150,000	15¢
Over 450,000	10¢

Minimum Charges

Size of Meter	Per Month
⅝" with 1 fixture	$ 2.00
¾"	3.00
1"	4.00
1½"	5.00
2"	12.50
3"	25.00
4"	33.33
6"	83.33

Selma, 25,000.

Gals. per Day	Rate per 1,000 Gals.
First 2,000	45¢
Next 1,000	35¢
" 2,000	30¢
" 5,000	25¢
" 10,000	20¢
Over 20,000	15¢

All less 33⅓ per cent. if paid by 10th of month.

Talladega, 10,000.

Abstract from the booklet "A City Plan for Talladega", dated January 30, 1928:

"At the present water rate, it is impossible for the Light and Water Commission to be self-sustaining as above outlined, and it is estimated that a raise in these rates of one-third is necessary to accomplish the purpose, although an increase of one-third can be given in the water allowance, thus making the new rate $8.00, and the allowance 24,000 gallons per quarter on the present $6.00 customers, and $6.00 and 18,000 gallons on the present $4.50 customers. The one-third increase is to also apply to the present wholesale rate of 12½ cents per 1,000 gallons, making the new rate 17 cents. Several old contracts on the old wholesale rate of 8 cents per 1,000 gallons, having expired, are also raised to the new wholesale rate of 17 cents, this representing a raise on them of more than 100 per cent.

Tuscaloosa, 20,000.

Cu. Ft. per Quarter	Rate per 100 Cu. Ft.	Bill
First 2,000	...	2,000—$ 5.00
Next 8,000	18¢	10,000— 19.40
" 5,000	16¢	15,000— 27.40
" 5,000	15¢	20,000— 34.90
" 5,000	14¢	25,000— 41.90
" 25,000	10¢	50,000— 66.90
" 70,000	9¢	120,000— 129.90
" 80,000	8¢	200,000— 193.90
" 300,000	6¢	500,000— 373.90
Over 500,000	5¢	

For consumers whose only fixtures are one opening the minimum charge shall be $3.33, for which there shall be an allowance of 1,000 cubic feet. For water consumed in excess of 1,000 cubic feet up to and including 2,000 cubic feet, the rate shall be 20 cents per 100 cubic feet. For water consumed in excess of 2,000 cubic feet, the rate per 100 cubic feet shall be as prescribed above.

Minimum Rates

Size of Meter	Per Quarter
⅝"	$ 5.00
¾"	7.50
1"	12.50
1½"	15.00
2"	30.00
3"	50.00

Wetumpka, 1,800.

Gals. per Month	Rate per 1,000 Gals.
First 5,000	40¢
Next 5,000	30¢
" 10,000	27½¢
" 30,000	25¢
" 100,000	22½¢
" 150,000	20¢
" 200,000	17½¢
Over 500,000	15¢

Minimum Charges

Size of Meter	Per Month
½" or ⅝"	$ 2.00
¾"	2.50
1"	3.00
1½"	6.00
2"	12.00
3"	25.00
4"	50.00
6"	125.00
8"	200.00

ARIZONA

Bisbee, 18,000.

Gals. per Month	Total Bill
1,000 or less	$1.50
1,010 to 2,000	2.50
2,010 to 3,000	3.25
	Rate per 1,000 Gals.
Next 22,000	1.00
" 75,000	.90
" 100,000	.85
" 100,000	.70
Over 300,000	.60

10 cents per 1,000 gallons added to above rates and discounted in full if bill is paid within 15 days.

Flagstaff, 5,000.

Residence Rates

Gals. per Month	Rate per 1,000 Gals.
First 1,000 (Minimum)	$1.50
Next 1,000	.50
Over 2,000	.20

Business Rates

First 1,000 (Minimum)	2.00
Over 1,000	.50

Residence minimum, $1.50 per month.
Business minimum, $2.00 per month.

Glendale

Gals.	Per 1,000 Gals.	Total Bill
First 7,500		$ 2.15
Next 7,500	22⅔¢	1.70
" 22,500	20¢	4.50
" 37,500	16¢	6.00
" 75,500	13⅓¢	10.00
" 150,000	10⅔¢	16.00
" 300,000	10⅔¢	32.00
Additional	9⅓¢	

Rate for first 7,500 gallons outside of corporation billed at $3.15. Other rates same as inside corporation.

Morenci, 5,000.

Gals.	
1,500 (minimum)	$1.50
	Rate per 1,000 Gals.
Next 500	.80
" 1,000	.60
" 2,000	.55
" 5,000	.50
" 15,000	.45
" 25,000	.40
" 50,000	.35
" 100,000	.30
Over 200,000	.27½

Phoenix, 60,000.

Gals.	Rate per 1,000 Gals.
First 500,000	12½¢
Next 500,000	10¢
" 500,000	8¢
" 500,000	7¢
Over 2,000,000	6¢

Minimum, $1.50.

ARKANSAS

Benton, 3,000.

Gals. per Month	Rate per 1,000 Gals.
First 3,000	40¢
Next 27,000	30¢
" 70,000	20¢
" 100,000	15¢
Over 200,000	10¢

Minimum, $1.20 per month.

Clarendon, 3,500.

Gals. per Month	Rate per 1,000 Gals.
First 5,000	50¢
Next 10,000	40¢
" 25,000	30¢
" 60,000	20¢
Over 100,000	15¢

Minimum, $1.00 per month, allowing 2,000 gals.

Clarksville, 2,500.

Gals. per Month	Rate per 1,000 Gals.
First 5,000	40¢
Next 5,000	30¢
" 10,000	25¢
" 30,000	20¢
Over 50,000	15¢

Minimum, $1.00 per month.

Hot Springs, 11,695.

Gals. per Month	Rate per 1,000 Gals.
First 25,000	44¢
Next 25,000	39¢
" 30,000	34¢
" 70,000	29¢
" 750,000	22¢
" 750,000	20½¢
Excess	17¢

Minimum monthly charge of $1.00 for each ¾-inch or smaller meter. Meters over ¾-inch carry increased minimum charge. Unless amount of bills during period of service from date of connection to date of disconnection equals $2.50, a service charge for an amount which, with the amount of the bills, equals $2.50, will be added. Special rates for consumers using water less than six months.

Jonesboro, 16,500.

Gals. per Month	
First 3,000 (minimum)	90¢ Rate per 1,000 Gals.
Next 10,000	27¢
" 40,000	22½¢
" 50,000	18¢
" 100,000	13½¢
" 100,000	9¢
Over 303,000	8¢

Mena, 3,441.

Gals. per Month	Rate per 1,000 Gals.
First 2,000	50¢
Next 5,000	30¢
" 5,000	25¢
" 5,000	20¢

Minimum rate, $1.00 per month.

Nashville, 3,600.

Gals. per Month	
First 3,000 (minimum)	$2.00 Rate per 1,000 Gals.
Next 4,000	40¢
" 8,000	35¢
" 10,000	30¢
" 25,000	20¢
Over 50,000	17½¢

Paris, 3,500.

Gals. per Month	Rate per 1,000 Gals.
First 5,000	40¢
Next 5,000	37¢
" 10,000	34¢
" 10,000	30¢
" 20,000	20¢
Over 50,000	12¢

Minimum $1.00 per month, allowing 2,500 gallons.

CALIFORNIA

Alhambra, 35,000.

Size of Meter	Min. Cu. Ft. per Mo.	Rate per 100 Cu. Ft.	Min. Bill
⅝"	800	12½¢	$1.00
¾"	1,000	12½¢	1.25
1"	1,200	12½¢	1.58
1½"	1,600	12½¢	2.00
2"	2,000	12½¢	2.50
All sizes to	10,000	10¢	
" " over	10,000	9¢	

Antioch, 4,200.

Cu. Ft. per Month	Rate per 100 Cu. Ft.
First 5,000	15¢
Next 5,000	10¢
Over 10,000	7¢

Minimum, $1.50 per month.

CALIFORNIA (Continued)

Chico, 15,000.

Cu. Ft. per Month	Rate per 100 Cu. Ft.
First 1,000	22¢
Next 2,000	17¢
" 2,000	12¢
" 35,000	9¢
Over 40,000	7¢

Claremont, 3,100.

Cu. Ft. per Month	
500 or less	$1.25
	Rate per 100 Cu. Ft.
Next 2,000	15¢
" 7,500	12½¢
Over 10,000	10¢

Corona, 6,500.

Cu. Ft. per Month	
600 or less	$1.25
	Rate per 100 Cu. Ft.
Next 1,400	16¢
" 3,000	13¢
" 10,000	10¢
Over 15,000	8¢

Minimum Rates

Size of Meter	Per Month
⅝"	$ 1.25
¾"	1.75
1"	2.50
1½"	4.50
2"	6.00
3"	10.00

Dinuba, 4,500.
House with lawns, $1.00 for 900 cu. ft. or less.
House, $1.00 for 600 cu. ft. or less.
Excess to 3,000 cu. ft., 9¢ 100 cu. ft.
Over 3,000 cu. ft., 7¢ 100 cu. ft.

Dixon, 1,500.

Gals. per Month	Rate per 1,000 Gals.
First 10,000	25¢
Next 10,000	15¢
" 80,000	10¢

El Segundo, 3,200.

Cu. Ft. per Month	
First 800 (minimum)	$1.50
	Rate per 100 Cu. Ft.
Next 2,200	5¢
Over 3,000	10¢

Eureka, 20,000.

Domestic Service

Gals. per Month	Rate per 1,000 Gals.
First 10,000	47.85¢
Over 10,000	29.48¢

Minimum

Size of Meter	Per Month
⅝"	$1.50
¾"	1.75
1"	2.00
1½"	2.25
2"	2.75

For water used for irrigating vegetable gardens planted on vacant lots fronting on streets where water-mains are installed, 16¢ per 1,000 gals., with minimum of $5.50 per season per lot.
Irrigation rates during summer months:
16¢ per 100 cu. ft. above average winter bill.

Industrial Rates

Gals. per Mo.	Per 1,000 Gals.	Bill	Bill
First 10,000	40¢	$4.00	$ 4.00
Next 90,000	25¢	22.50	26.50
" 900,000	18½¢	166.50	193.00
Over 1,000,000	12½¢		

Fresno, 73,000.

Gals. per Month	Rate per 1,000 Gals.
First 20,000	25¢
Next 30,000	9¢
" 200,000	7¢
" 250,000	5¢
Over 500,000	3¢

Fullerton, 4,415.
Minimum $1.25, allowing 5,000 gals.
Excess at 10¢ per 1,000 gals.

Glendora, 4,000.
Minimum $1.35, allowing 500 cu. ft.
Excess at 12¢ per 100 cu. ft.

Hayward, 10,000.
Minimum $1.00, allowing 300 cu. ft.
Next 4,700 cu. ft. 30¢ per 100 cu. ft.
Over 5,000 cu. ft. 25¢ per 100 cu. ft.

Hercules, 1,500.

Cu. Ft. per Month	Rate per 100 Cu. Ft.
First 300	25¢
Over 300	20¢

Service Charge
Domestic services, 50¢ per month.
Hercules Powder Co., $100 per month.

La Mesa, 5,000. (Includes other small towns.)

Cu. Ft. per Month	Rate per 100 Cu. Ft.
First 1,000	15¢
Next 2,000	10¢
Over 3,000	6¢

Minimum Charges

Size of Meter	Per Month
⅝" x ¾"	$1.00
¾"	1.50
1"	2.00
1½"	3.00
2"	4.00
3"	7.00
4"	12.00

A surcharge to cover the cost of pumping, amounting to 30 per cent. of the total monthly bill, shall be added to all bills for water where such water is supplied by pumping-plants operated at the expense of the La Mesa, Lemon Grove and Spring Valley Irrigation District.

Lindsay, 3,500.

Minimum Rates
(including 5,000 gallons)

Size of Meter	Per Month
⅝" or ¾"	$1.00
1"	1.25
1½"	1.50
2"	2.00
3"	3.00
Gals. per Month	Rate per 1,000 Gals.
Next 100,000	12¢
Over 105,000	10¢

Water supplied to schools for 10¢ per 1,000 gals.

Lompoc, 2,500.

Cu. Ft.	Rate per 100 Cu. Ft.
First 4,000	15¢
Over 4,000	10¢

Minimum $1.50 for first 1,000 cu. ft.

Long Beach, 155,000.

Cu. Ft. per Month	Rate per 100 Cu. Ft.
First 1,000	15¢
Next 4,000	10¢
" 10,000	8¢
" 10,000	7¢
" 75,000	6¢
Over 100,000	5¢

Minimum Rates

Size of Meter	Per Month
¾"	$0.75
1"	1.00
1½"	1.50
2"	2.00
3"	4.50
4"	9.50

Manhattan Beach, 3,500.

500 or less	$1.00
First 5,000	1.50
Gals. per Month	Rate per 1,000 Gals.
Next 14,500	15¢
" 40,000	12¢
Over 60,000	10¢

Monterey, 15,000. (Includes also Pacific Grove, Carmel and Pebble Beach.)

Cu. Ft. per Month	
300 or less	$1.10
	Rate per 100 Cu. Ft.
Next 700	30¢
Over 1,000	25¢

Minimum Rates

Size of Meter	Per Month
½"	$1.10
1"	1.50
1½"	2.25
2"	3.00
3"	4.00

National City, 20,000. (Includes Chula Vista.)

Cu. Ft. per Month	Rate per 100 Cu. Ft.
First 1,000	25¢
Next 1,000	15¢
Over 2,000	5¢
" 2,000 for other than irrigation use	15¢

Minimum Charges

Size of Meter	Per Month	Allowance Cu. Ft.
⅝"	$ 1.25	500
¾"	1.50	700
1"	2.00	800
1½"	3.00	1,333
2"	4.00	2,000
3"	7.00	8,000
4"	12.00	18,000

Oakland, 552,000. (Includes Berkeley, Alameda, Richmond, Piedmont, Albany, Emeryville, El Cerrito, San Leandro and Newark.)

Cu. Ft. per Month	Rate per 100 Cu. Ft.
First 50,000	23¢
Over 50,000	19¢

Service Charge

Size of Meter	Per Month
⅝"	$0.50
¾"	1.00
1"	1.50
1½"	2.50
2"	4.50
3"	8.00
4"	12.50
6"	25.00

Ontario, 15,000.

Cu. Ft. per Month	
First 700 (minimum)	$1.33
	Rate per 1,000 Cu. Ft.
Next 4,300	1.00
Over 5,000	.80

Pomona, 15,000.

Cu. Ft. per Month	
First 700	$1.25
	Rate per 100 Cu. Ft.
Next 4,300	15¢
Over 5,000	8¢

Minimum Charges

Size of Meter	Per Month
⅝"	$1.25
¾"	1.50
1"	2.00
1½"	2.50
2"	3.00

Red Bluff, 4,000.

Cu. Ft. per Month	
600 or less	$1.00
	Rate per 100 Cu. Ft.
Next 2,400	14¢
" 3,000	10¢
Over 6,000	5¢

Minimum Rates

Size of Meter	Per Month
⅝"	$ 1.00
¾"	1.50
1"	2.00
1½"	2.50
2"	5.00
3"	10.00
4"	25.00

Riverside, 30,000.

Domestic
Minimum Charges
(allowing 1,500 cu. ft.)

Size of Meter	Per Month
⅝"	$1.50
¾"	2.00
1"	2.50
1½"	3.25
2"	4.00
3"	6.00
4"	8.00
Cu. Ft. per Month	Rate per 100 Cu. Ft.
Next 2,000	7¢
Over 3,500	6¢

Industrial

First 5,000	Same as above
Over 5,000	5¢

San Jose, 80,000.

Cu. Ft. per Month	Rate per 100 Cu. Ft.
First 600	25¢
Next 900	22½¢
" 1,500	20¢
" 7,000	15¢
Over 10,000	12¢

Minimum Charges

Size of Meter	Per Month
⅝"	$ 1.50
¾"	2.00
1"	3.00
1½"	6.00
2"	9.00
3"	18.00
4"	28.00
6"	55.00

San Mateo, 16,000.

Cu. Ft. per Month	Rate per 100 Cu. Ft.
First 3,000	25¢
Over 3,000	22¢

Service Charge

Size of Meter	Per Month
⅝" and ¾"	$0.50
1"	1.25
2"	3.00
3"	4.50
4"	6.00

San Rafael, 45,000. (Marin Municipal Water District includes Belvedere, Corte Madera, Fairfax, Kentfield, Larkspur, Manor, Mill Valley, Ross, San Anselmo, San Quentin, San Rafael, Sausalito and Tiburon.)

Minimum Charges
(allowing 300 cu. ft.)

Size of Meter	Per Month
⅝"	$ 1.50
¾"	1.75
1"	2.25
1½"	3.25
2"	5.25
3"	8.75
4"	13.25
Cu. Ft. per Month	Rate per 100 Cu. Ft.
Next 9,700	25¢
" 350,000	23¢
Over 360,000	21½¢

Santa Ana, 33,000.

Cu. Ft. per Month	
First 1,000	$1.25
	Rate per 100 Cu. Ft.
Next 3,000	10¢
Over 4,000	8¢

Public schools pay regular rate for first 1,000 cubic feet, and are allowed 50 per cent. discount for excess.

Santa Barbara, 35,400.

Minimum Charges

Size of Meter	Per Mo.	Allowance Cu. Ft.
⅝"	$1.00	1,000
¾"	1.30	1,200
1"	1.60	1,400
1½"	1.90	1,600
2"	2.20	1,800
Cu. Ft. per Month		Rate per 100 Cu. Ft.
Excess to 4,000		15¢
Next 21,000		12¢
Over 25,000		9¢

(To be continued in the July issue)

THE TAXPAYER'S DOLLAR

A Monthly Department of Budgeting, Assessment, Taxation, Accounting and Other Phases of Municipal Finance

Conducted by A. E. BUCK, *National Institute of Public Administration, New York*

In inaugurating this series of notes, it is our purpose to call attention each month to some of the more important happenings in the broad field of municipal finance. We intend from time to time to discuss not only the news events in this field, but also the more fundamental aspects and problems of financial administration and methods in city governments. Any suggestions which the readers of these notes may care to make with respect to the topics that should be discussed will be appreciated.

Five-Year Financial Program for the District of Columbia

DANIEL J. DONOVAN, auditor and budget officer of the District of Columbia, has recently prepared a five-year financial program for the District. This program includes both current and capital expenditures; it sets up each year's requirements separately, beginning with the fiscal year ending June 30, 1930. The need for such a program, according to Mr. Donovan, was clearly brought out at the close of the recent regular session of Congress when "legislation was enacted for the District of Columbia as the result of which the District will be required within the next few years to meet unusually heavy expenditures for major improvements."

The appropriations recommended for the five-year period covered by the program aggregate $230,616,000. It is proposed to finance those appropriations by maintaining the existing tax rate of $1.70, assuming that the United States government continues its present annual contribution of $9,000,000. Each year's expenditures in the five-year program are briefly but clearly set forth, differentiating between those for current purposes and those for capital outlays. The means of financing these expenditures are also shown for each year.

It is proposed to revise the program annually, extending it one year each time so as to maintain it continually as a five-year financial plan. At each revision, the year nearest the current period would become the basis for the annual budget. This is in line with the latest development in long-time planning for municipalities.

Current Budget Practice in Philadelphia

THE budget practice of Philadelphia has been severely criticised by the local Bureau of Municipal Research in a recent number of its weekly leaflet called "Citizens' Business." The experience of the last few years, the Bureau thinks, affords ample proof that Philadelphia needs a change in its budgetary procedure. It says:

"The fact that 1928 ended with a deficit of about $4,500,000, notwithstanding that the tax rate had been increased from $1.75 to $1.95, notwithstanding that $2,265,986.47 of sinking-fund surpluses were used in reduction of appropriations to the sinking funds, and notwithstanding that the public was assured by the leaders in city council that the year would close with a surplus of $1,000,000 to $2,000,000; the fact that 1928 was the seventh successive year to end with a deficit; the fact that the deficit amounted to $7,078,000 in 1927 and to $4,034,000 in 1926; the fact that, contrary to the charter, millions of dollars of goods are purchased by the city year after year without authority of an appropriation; the fact that great confusion seems to exist almost constantly concerning the city's current financial proof that some substantial change in the city's budget practices is needed.

"In a very real sense, the major defects in the city's budget practice are reflected in the annual appropriations. These almost invariably fall far short of providing for the year's needs. They do not even represent estimates of those needs. The shortages in appropriations are almost always deliberate. They are explained on the grounds that in the early part of the year a surplus from the preceding year will be available for appropriation and that the actual receipts of the year itself will greatly exceed the estimated receipts, thus making available for appropriation and use during the year large amounts of 'excess receipts.' Frequently, these two sources of additional appropriations are estimated to produce from $2,000,000 to $4,000,000 in a year."

Cincinnati's New Accounting System

A GENERAL accounting system was installed in the city government of Cincinnati during the past year. In his annual report, recently issued, City Manager Sherrill said that it had effected large savings and given complete budgetary control, adding that "with this new system and efficient mechanical devices, the city manager and departments are able to secure complete financial statements the day following any particularly designated period."

This punctual reporting is made possible largely through the use of the Hollerith tabulating machines. A "battery" of these machines, consisting of one Hollerith electric tabulating and accounting machine, one horizontal sorter, and one duplicating key punch, has been installed in the city auditor's office. This tabulating equipment uses the 80-column tabulating card and automatically prints the results of its work. By the use of the newer 80-column, instead of the older 45-column, tabulating card, it is possible to put a great deal more information on a single card. An account may be encumbered and released on the same card; at the same time a complete classification and analysis may be made. Tabulated reports are produced showing a daily statement of certifications, cash disbursements, and expenditures, and a monthly statement of expenditures, credits, fund balances, changes in stores, and properties acquired. A detailed manual on the tabulating methods has been prepared for use in the auditor's office.

Budgetary codes have been worked out and adopted covering organization units, functions, income, and expenditures. The classification of income and the classification of expenditures by objects are especially noteworthy. They represent perhaps the best types of such classifications to be found anywhere in the United States. In connection with the classification of expenditures, about 5,000 objects, purchased by the city government, have been classified and coded. The code numbers are used in making the punch card analyses. These classifications have been issued in printed form under the title of "Budgetary Codes of the City of Cincinnati."

Pay-As-You-Go Discussed by the Detroit Bureau

THE Detroit Bureau of Governmental Research in an interesting and readable series of folders, called "Just a Minute," gives its views of the pay-as-you-go policy. Among other things, it says:

"The last few years have seen a turning to pay-as-you-go for recurring public improvements as a means of materially reducing the cost of government. Pay-as-you-go means that you acquire public works for $1 in taxes which under the debt plan still cost $1 in taxes plus fifty or sixty cents more in taxes for interest.

"Take a hypothetical example: Say a city must spend $1,000,000 each year for improvements. It can raise this sum by taxation or by going into debt. Suppose it goes into debt by issuing $1,000,000

thirty-year, 4½ per cent serial bonds. The first year there would be a saving to the taxpayer of not quite $1,000,000 since $45,000 would have to be paid for interest and, say one-thirtieth, or $33,000 of the principal. The second year the saving would be less because there would be two installments of interest and principal to be paid. The saving gradually decreases until the 14th year, when the interest and principal charges would equal practically $1,000,000. From that year on, the amount to be raised in taxes for debt service would constantly increase until the 30th year, when it would be $1,697,500. During these 30 years, the public has gotten $30,000,000 in public improvements. It has paid out a few thousand dollars less than $30,000,000 in interest and debt retirement charges. It still owes nearly $15,000,000, plus interest.

"And at the end of the 30-year period, such a debt has become practically a permanent debt. The city goes on issuing $1,000,000 bonds each year because of the continued necessity for new capital structures. It goes on paying $1,697,500 in interest and sinking fund charges. New debt is substituted for the debt that is retired. This city is always abreast of its capital improvement program, but always behind in its financing. A tax moratorium was had for the first 14 years, but uncounted generations must pay for the small benefit had by a few taxpayers for a few years.

"It may be argued that such a system is sound because the city can borrow money much more cheaply than can an individual. Or, to state it another way, the money which has been retained in the pockets of taxpayers can be made to earn more per dollar than the city must pay out in interest. This is a plausible fallacy. If dollars in private business were so productive, it would be an error for the city ever to tax its citizens to pay its debts. It should even bond itself to pay for current expenses. In truth, private dollars are not so productive or we would all, by virtue of compound interest, be rich on our greatgrandfather's investments. Financiers would probably say that the hardest job in the world is to make money earn 6 per cent year in and year out with safety."

Wastes in Purchasing at Kansas City, Mo.

IN a recent bulletin issued by the Kansas City Public Service Institute a rather severe indictment is brought against the city authorities for their failure to use systematic purchasing methods. It is shown that the city government buys a wide variety of supplies, materials and equipment without any attempt at standardization and upon inadequate specifications. The existing purchasing procedure does not encourage competition; many reliable firms do not bid for the city's business. The city government buys what it needs in driblets; it has no central stores system. When quantities of materials or supplies are purchased, losses often occur through improvised storage facilities. Carelessness prevails in the approval of invoices for goods, often resulting in duplicate or erroneous payments. In short, the city government enjoys none of the advantages which accrue from modern purchasing methods now used by a great many cities of the United States.

Instructions for Preparing City Budget Estimates

BERKELEY, CALIF., may be placed in the front rank of the cities of this country so far as progressive budgetary methods are concerned. This is due, more than anything else, to the administrative ability of Manager John N. Edy of that city and to the technical skill of his budget officer, J. H. Jamison. Mr. Edy recently issued the following instructions with reference to the preparation of the budget estimates, which are worthy of study by other city executives:

"1. No department, or group of departments performing a specific function, may assume that it is entitled to receive for expenditure a predetermined percentage of the whole budget, or an increase in budget allowance proportional to estimated increase in population or in assessed valuation, or in revenue.

"2. It is not necessary that the budget of every department shall increase year by year.

"3. The fact that certain activities and services and duties are recognized in the current budget is no guarantee that all of them will be or should be continued.

"4. The importance of new services or duties, when proposed by department heads, will be weighed against the importance of the several services and duties of the then prevailing program of the department. It may be reasonable and feasible to do something *in lieu* of something else; it may not be possible to finance the new thing in addition to all else.

"5. The budgets of those departments which produce revenue cannot be measured by the amount of their receipts.

"6. Departmental budgets must be determined by the most efficient and economical means of performing the work authorized.

"7. Every department desires to attain a superior standard of accomplishment—to be a model department of its kind, and to serve as an example to those of other cities. It must be remembered, however, that the standard of organization and service which we will undertake *is only that which is reasonable and practicable for Berkeley*. We are pleased if and when we contribute something of value in the field of municipal government; but, in the absence of a specific appropriation therefor, such contribution must always be a by-product of our best efforts to meet local needs.

"8. While it is true that city governments receive many requests for new public improvements and service extensions to be financed out of taxes, we cannot lose sight of this fundamental fact: Informal proposals for additional expenditure that are so frequently put forth by individual citizens or by special groups cannot be interpreted as an expression of the willingness of the public, or even of themselves, to pay more taxes.

"9. It is erroneous to assume that the only way to meet a legitimate requirement for new or extended service is by employing additional people and buying equipment. This means should be resorted to only after exhausting the possibilities of improved methods, ingenious devices and an unprejudiced appraisal of the value of every feature of the prevailing program, and of the ability of every present employee. That is the practice of successful private business, and it must be the practice of a public service that would be successful in every respect.

"10. Before transmitting budget requests it is the obligation of department heads to ascertain, by personal inquiry and detailed analysis:

(a) Whether any duty or service now being performed may safely and properly be discontinued;

(b) Whether any practice or method of work should be abandoned in favor of one that is likely to be more economical and equally effectual, or more effectual at the same cost;

(c) Whether economies may be effected by combining duties or consolidating positions;

(d) Whether every employee is carrying a full load of necessary work. By 'full load' is meant the output that would be demanded of the individual by the most efficiently managed private enterprise;

(e) Whether there is any unnecessary expense for personal transportation, or whether another form of personal transportation would be more economical;

(f) Whether the efficiency of the department would be increased by change or transfer of personnel;

(g) Whether any employee is overpaid by comparison with similar service in the same department or another."

Schenectady's Long-Term Financial and Improvement Program

A LONG-term financial and improvement program for Schenectady, N. Y., was issued in April by the capital budget commission of that city. The technical work in connection with the formulation of this program was done by the Schenectady Bureau of Municipal Research under the direction of Joseph F. Base. The program is presented as a mimeographed document of 69 pages, replete with charts, diagrams and tables.

The program includes both current and capital expenditures and means of financing for a period of ten years. As a basis for the program a careful study was made of the growth of the city's population and area. Some rather illuminating facts, figures, and charts have been assembled with respect to these features. The city's income has been thoroughly analyzed as to existing sources and probable new sources. The expenditure requirements for current purposes and for debt retirement are predicted for the period covered by the program. Certain suggestions for retrenchment in expenditures during this period are also made. A complete schedule of proposed improvements is set forth for ten years, having been determined in view of

present commitments and the future needs of the city. Bonds are recommended to meet the cost of certain of the improvements. Street reconstruction projects, however, are to be met on a pay-as-you-go plan as soon as conditions will permit this to be done.

The Financial Methods of Fall River

HOWARD G. FISHACK, director of the Taxpayer's Association of Fall River, Mass., has recently issued a series of bulletins in which he applied the twenty-five standard tests set up by Professor W. B. Munro of Harvard to the Fall River city government. On the test relating to budgetary procedure and control, Mr. Fishack makes the following comments:

"In two fundamental respects the present budget system is still seriously at fault. The fiscal year starts January 1, but the budget for the year does not become operative until April 1. Approximately four months, a third of the fiscal year, is taken up with its preparation by the mayor and approval by the council. During this time the city departments do not operate under the budget and are permitted by state law to spend, each month, an amount equal to the greatest monthly expenditure during the previous year. As a result, departments that may be so inclined can spend most of their yearly appropriation before the budget is ever put in effect and, on the plea of having no funds, obtain a supplementary appropriation later in the year.

"The other defect of the present budget system is the city's failure to control the budget and keep department expenditures within the appropriations. At present materials, supplies, etc., are purchased by the city departments, the bills being sent by the departments to the auditor, who credits the proper account when payment is made. The auditor has no knowledge of such expenditures or the amounts outstanding against appropriations until the bills are delivered to him weeks and, in some cases, months after the order has been filled. As a result, it is possible for any city department to place orders that exceed its appropriations, and the fact would not be known by the city's financial officer until after the goods were delivered and used. One of the most needed improvements in the present system is control of appropriations that will permit the auditor to know at all times the true balance in every appropriation and the total purchase orders outstanding against it."

The difficulties resulting from the adoption of the budget three or four months after the opening of the fiscal year to which it applies are common to all Massachusetts cities. Mr. Fishack's observations with respect to Fall River may therefore be true of many other cities in that state.

On the test relating to municipal borrowing, Mr. Fishack makes the following statement:

"It cannot be assumed that the improvement projects financed by bonds can be entirely eliminated, but the city's needs can be closely studied and so arranged that only the most essential projects are undertaken. The fact that the city has continued to issue bonds in large amounts each year, regardless of existing financial difficulties, hardly indicates sound borrowing policies. Such reckless spending of bond funds, as has been practiced since 1920, has made Fall River the most debt-burdened city in the Commonwealth, for today Fall River's net bonded debt equals 6.04 per cent of its assessed value, compared with other cities having bonded debts of from 1.34 per cent to 5.07 per cent of their assessed value. In the face of such condition, the need for an economical improvement program is apparent."

Budget Accounting

The Third of a Series of Articles on Mechanical Budgetary Control Accounting, for Municipalities and Other Public Bodies, Which Began in April

By GEORGE G. SCOTT, C.P.A.
CHARLOTTE, N. C.

THE effectiveness of budgetary control is not any greater than the adequacy of the system of budget accounting.

The value of budget control information makes it necessary to maintain a satisfactory system of budget accounts.

Under the old cash-book systems it is impracticable and impossible to devise and maintain a satisfactory system of budget accounts that will show at the close of the day the budget control information now required by a modern and scientifically organized administration. With the use of such inadequate methods, the budget statements cannot be satisfactorily constructed more frequently than once each month. The position of the budget and other important budget information is not usually known, or such information is not available but once each month, and frequently some ten to twenty days after the month closes. The lack of availability of the budget information at all times, tends to minimize the importance and the effectiveness of budgetary control.

The outstanding feature of the mechanical budgetary control system, is the budget ledger and the daily information it produces without increasing the clerical expenses.

The introduction of bookkeeping machinery and the invention of the block posting voucher, has made it possible to devise a system of budget accounting heretofore impossible and unknown under the old cash-book methods, which for simplicity, completeness and promptness of information, makes budget accounting the most important phase of the entire system of accounts.

The clerical work of posting by machine the market orders, and the other commitments, including the expenses against the authorizations, automatically closes the budget-control books for statements to be prepared at the close of each day.

The Purpose of Budget Accounts

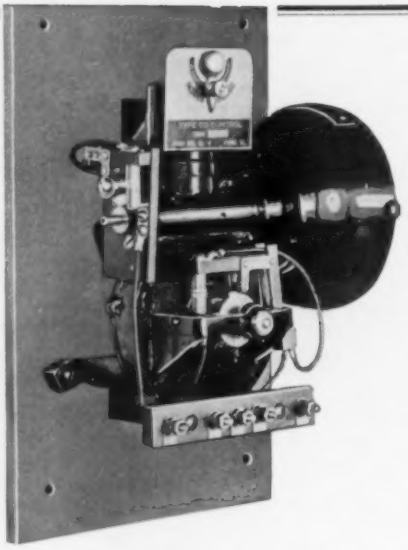
It will be understood that the budget accounts do not represent the assets, liabilities, expenses or the revenues. The principal divisions of the budget accounts are indicated on the chart on the next page, which shows the balanced control accounts.

Neither a statement of operations nor a statement of assets and liabilities can be prepared from the budget accounts. Budget information is entirely different in character from that produced from the nominal and proprietary accounts. The budget accounts show the effect of actual operations upon the predetermined plan adopted to cover the financial operations of the year.

The annual budget, after preparation and adoption, is immediately set up in the budget ledger. The appropriations, or authorizations, are credits, and the requirements or estimated revenues are debits, which make a balanced ledger. The budget transactions are, under the mechanical system, posted daily to the budget accounts, and as the work of posting automatically closes the books without the usual mental or hand work of adding, subtracting and balancing, complete information is immediately available.

The budget accounts are divided into two sections. One section is the control accounts; the other consists of the detail accounts. A statement of the budget position is prepared from the controls, and the condition of the appropriations is shown by the detail ac-

Where Seconds Count



Master Timer—Type LW

The best managed manufacturing concern knows that the time spent by employees during working hours has a dollar and cents value and great care is taken to guarantee that each worker is paid only for the actual time he works. —Convincing proof that TIME IS MONEY.

The economic loss, due to congested traffic, runs into millions of dollars every year and this loss is traced directly to lost time.

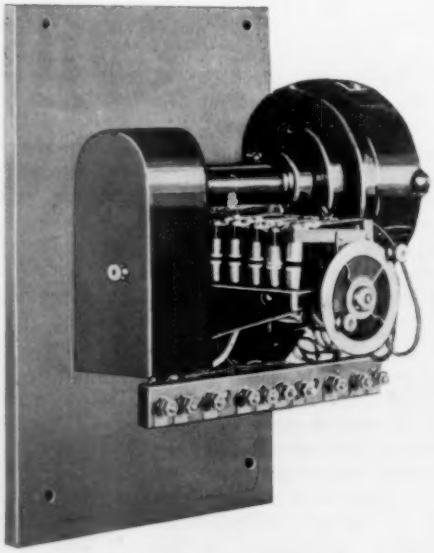
By proper regulation and timing of traffic signals, the congested traffic conditions can be eliminated and the economic loss reduced to a minimum.

The Essco Progressive System is the Answer

The Master Control is located at some central location, with an Auxiliary Control located at each intersection protected by Signals. These controls can be so timed that traffic can travel at a predetermined speed through the entire system, without stops. This is done, regardless of the length of the blocks, or the amount of traffic. Cross traffic and pedestrian traffic are also cared for in a satisfactory manner.

The ESSCO PROGRESSIVE SYSTEM is most flexible, not only taking care of the present condition but also considering the future.

Your present system can be made up-to-date with very little expense. Trained traffic engineers are at your service and will survey your present system, recommending necessary changes.

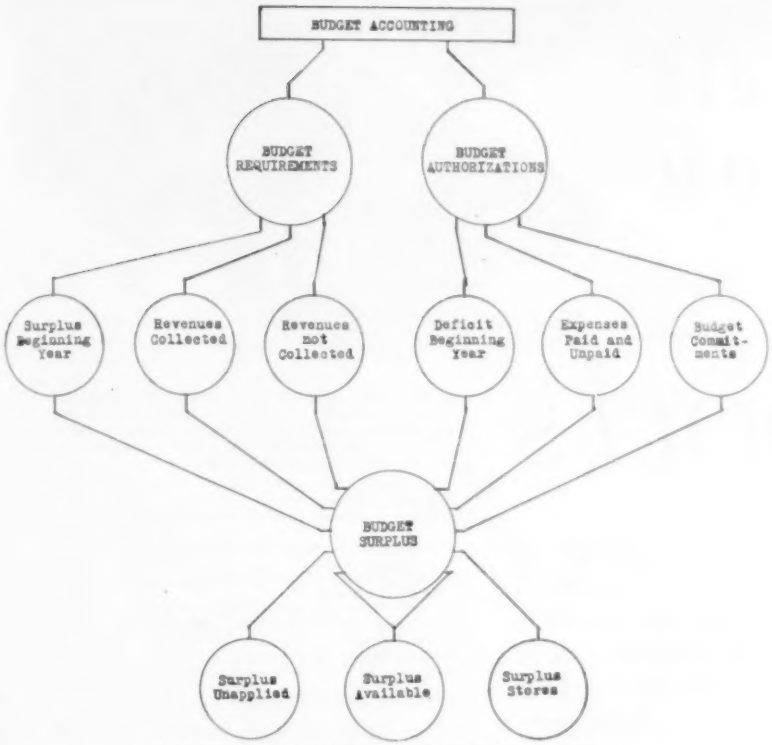


Auxiliary Control—Type LW

Builders of everything for the Control of Traffic

ESSCO MANUFACTURING COMPANY
PEORIA, ILLINOIS

Over 100 items that you should know about



PRINCIPAL DIVISIONS OF THE BUDGET ACCOUNTS

counts. The preparation of these statements, like all other statements prepared from the other divisions of accounts, is done by merely copying ledger balances, which represents a simple clerical operation.

The Statement of Budget Position

Attention is directed to the following form of statement, which is a reproduction of block "A" of the daily municipal report form that is for the purpose of exhibiting the budget position at the close of the day.

The statement shows the usual control accounts of the budget which make a balanced ledger, and presents condensed budget information of interest and value, and a picture of the effect of operations which is not and cannot be produced by the expense and revenue accounts, nor the accounts of the assets and liabilities.

There are two general control accounts of the appropriations, one for the appropriations for the ordinary operating expenses, and the other for the outlays and special appropriations. Against these two controls are charged the commitments, such as market orders when issued (except stores orders), also expenses and other obligations, which produce the unencumbered balances of appropriations.

It is seen that the charges against appropriations consist of two classes, one representing the expenses both paid and unpaid, and the other class of charges consists of commitments, which are open market orders, unfinished contracts, accrued expenses not due and other uncompleted transactions. The latter class constitutes the budget reserve accounts, which are liquidated by the completion of the transactions they represent.

Purchase orders issued for stores do not affect the appropriations, as they become a part of the budget surplus. Supplies and materials are handled as inventories until consumed. When consumed, they are then charged against

A | **Debits** — **BUDGET POSITION** — **Credits**

A—BUDGET REQUIREMENTS CONTROL ACCOUNT - $.....
This shows the total amount of Revenues required to meet the total amount of Annual Appropriations for all purposes.

B—LESS REVENUES ASCERTAINED - - - - - $.....
This shows the total amount of Revenues ascertained, including both collected and the uncollected that have been set up in the books and in process of collection.

C—BALANCE OF BUDGET REQUIREMENTS - - $.....
This shows the balance of Revenues required to meet the total appropriations for all purposes.

D—STORES IN TRANSIT - - - - - - - - $.....
This shows the total amount of Purchase Orders outstanding for Supplies and Materials to be delivered to the Store-Warehouse.

BUDGET SURPLUS ACCOUNTS

E—UNAPPLIED SURPLUS ACCOUNT $.....
This shows the portion of the Budget Surplus invested in uncollected taxes, monthly water and light consumer's accounts, and other Revenue Assets that have been set up in the books and are in process of collection.

F—STORES INVENTORY ACCOUNT $.....
This shows the total amount of Supplies and Materials on hand that have not yet been consumed.

G—AVAILABLE SURPLUS ACCOUNT $.....
This shows the availability of the Budget Surplus, which is determined by charging all cash arising from the Revenues, and deducting all expenses including both paid and unpaid.

H—TOTAL BUDGET SURPLUS - - - - - - $.....
This shows the total Budget Surplus for meeting unincumbered Appropriations, Reserves and Commitments of the Budget.

BALANCING TOTAL - - - - - - - - $.....

I—TOTAL BUDGET APPROPRIATIONS FOR ORDINARY OPERATING EXPENSES - - - - - - $.....
This shows the total Appropriations for the operating and maintenance expenses for the year.

J—LESS TOTAL EXPENSES AND OBLIGATIONS FOR OPERATING AND MAINTENANCE EXPENSES - - $.....
This shows the total Operating Expenses paid and unpaid, also outstanding purchasing orders and other obligations chargeable against Appropriations for ordinary operating expenses.

K—UNINCUMBERED BALANCE OF APPROPRIATIONS $.....
This shows the Unincumbered Balance of Appropriations for ordinary Operating and Maintenance Expenses for the remaining portion of the year.

L—TOTAL BUDGET APPROPRIATIONS FOR OUTLAYS AND OTHER EXTRAORDINARY PURPOSES - - $.....
This shows the total Appropriations for Outlays and other Extraordinary purposes for the year.

M—LESS EXPENSES AND OBLIGATIONS $.....
This shows the total expenses and obligations for Outlays and other extraordinary purposes.

N—UNINCUMBERED BALANCE OF APPROPRIATIONS $.....
This shows the balance of Unincumbered Appropriations for Outlays and other extraordinary purposes.

O—TOTAL UNINCUMBERED BALANCE OF APPROPRIATIONS FOR ALL PURPOSES - - - - - - - $.....

P—RESERVE SET ASIDE FOR OUTSTANDING PURCHASE ORDERS - - - - - - - - - - $.....
This shows the total outstanding Purchase Orders for Supplies and Materials which have not been filled and invoices that have not been received.

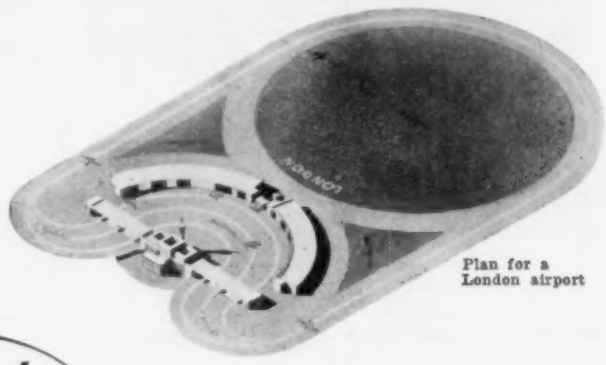
Q—RESERVE SET ASIDE FOR ACCRUED EXPENSES $.....
This shows the accrued expenses not due to be paid, such as Debt Service Expenses, Payrolls, Etc.

BALANCING TOTAL - - - - - - - - $.....

BLOCK "A" OF THE DAILY REPORT

How Well Will You Build?

Airports



Plan for a London airport

devoted exclusively to every phase of airport planning, places before you each month, in text and pictures, world-wide activities in airport design, construction, equipment and management—useful information to municipalities with airports to build and operate.

How well you build depends largely upon how authoritative is your information.

Airports is an authority!

Mr. Clifford W. Henderson, Director of Airports for the City of Los Angeles, has this to say about *Airports:*

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A Better Building Program.....August, 1928
Airport Architecture and Planning...May, 1929
Airport Buildings and the Fire Problem I February, 1929
Airport Buildings and the Fire Problem II April, 1929
Airport Planning I.....April, 1928
Airport Planning II.....July, 1928
Airport Sites and Sizes.....December, 1928
Airports to Serve the City.....September, 1928
Anent the Runway.....September, 1928
British Architects Competition.....April, 1929
Building the City Around the Airport I February, 1929
Building the City Around the Airport II March, 1929
Commercial Airways Weather Service.April, 1929
Designing Safe and Adequate Airports I October, 1928
Designing Safe and Adequate Airports II November, 1928
Designing Safe and Adequate Airports III December, 1928
Drainage Factor in Airport Site Selection March, 1929
Effect of Grading Operations on Soil Characteristics .....May, 1929
Floodlight Consideration for Large Airdromes I .....March, 1929
Floodlight Consideration for Large Airdromes II .....April, 1929
Lighting Our Airports.....April, 1928
New York's Municipal Airport.....June, 1928
New York State Plans for Aviation...June, 1928
Of What Shall We Build the Hangar November, 1928
Permanent Airport Structures....October, 1928
Permanent Runways for Safe Air Transportation .....April, 1929
Planning Seattle's Airport.....April, 1928
Signal System at Croydon.....December, 1928
The St. Paul Beacon.....September, 1928
What Is an Airport?.....December, 1928
Your City—A Port of Call.....April, 1928

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B DEPARTMENTAL BUDGET INFORMATION

	Total Appropriations For Year	Expenses and Obligations to Date	Unincumbered Balances Close of Today's Business	Allotment for Current Month	Expenses and Obligations for Current Month To Date	Unincumbered Allotment Balances Today
100—GENERAL GOVERNMENT AND DEBT SERVICE - Appropriations for debt service, expenses for City Council, City Manager, election expenses, litigation, and other general expenses.	$	$	$	$	$	$
200—JUDICIAL AND LEGAL DEPARTMENT - - - - Appropriations for expenses of City Attorney, Municipal Courts and Juvenile Courts.						
300—DEPARTMENT OF FINANCE - - - - - - - - Appropriations for expenses of City Auditor, Accounting Office, Treasurer, Purchasing Agent, Tax Collector, Etc.						
400—DEPARTMENT OF PUBLIC SAFETY - - - - - Appropriations for expenses of Police Force, Fire Force, and Inspection Force.						
500—DEPARTMENT OF PUBLIC SERVICE - - - - - Appropriations for Engineering, Street Cleaning, Markets, Street Lighting, Maintenance of Streets, Etc.						
600—DEPARTMENT OF PUBLIC SCHOOLS - - - - - Appropriations for the expenses of the Public School System.						
700—DEPARTMENT OF PUBLIC WELFARE - - - - Appropriations for the expenses of Health, Incinerator, Parks and Playgrounds, Etc.						
800—DEPARTMENT OF LIBRARIES - - - - - - - - Appropriations for the expenses of the Public Libraries.						
900—DEPARTMENT OF PUBLIC UTILITIES - - - - Appropriations for the expenses of Water, Gas and Electric Departments.						
1000—DEPARTMENT OF HOSPITALS - - - - - - - - Appropriations for the expenses of Hospitals.						
1100—MOTOR TRANSPORT DEPARTMENT - - - - - Appropriations for Municipal Garage and the operation of Trucks, Automobiles, and all automotive equipment except the Fire Equipment.						
TOTALS ORDINARY OPERATING AND MAINTENANCE PURPOSES - - - - - - - - - - - -	$		$	$	$	$
1200—CAPITAL OUTLAYS AND OTHER EXTRAORDINARY PURPOSES - - - - - - - - - - - - This shows the total Appropriations for Capital Outlays and other extraordinary expenses not classified as ordinary operating or maintenance expenses.						
TOTALS	$	$	$	$	$	$

BLOCK "B" OF THE DAILY REPORT

appropriations.

The requirements control account represents in all cases the amount of the total appropriations, and is reduced by crediting all revenues ascertained, both collected revenues and revenues set up in the books and in process of collection, which produces a balance of requirements that indicates the total amount of revenues to be secured before the year closes.

The three accounts of the budget surplus are regarded as the most significant and most important in the entire control accounts.

The surplus of the budget consists of the three following named accounts, which show where the surplus is or where invested

1—Unapplied Surplus
2—Available Surplus
3—Stores Surplus

The aggregate of the balances of these three surplus accounts represents the total budget surplus, out of which the expenses for the remaining portion of the budget year must be met.

The Unapplied Surplus account indicates that portion of the budget surplus that is invested in the uncollected revenues that have been ascertained and set up in the books and are in process of collection, such as uncollected taxes, uncollected utility bills and other revenues that have been ascertained and not collected.

The Available Surplus account indicates the cash position of the budget. If it is a debit balance, it means that the total receipts from the collection of revenues are in excess of the total expenses, both paid and unpaid. If it is a credit balance, it would mean an overdraft and the reverse condition.

The Stores Surplus account indicates the amount of surplus invested in material and supplies of all departments on hand.

It will be understood that receipts from borrowed money or the payment thereof, do not affect the budget accounts. It is possible for the Available Surplus account to show a credit balance or overdraft, when at the same time the account of the Treasurer will show a large amount of cash on hand.

The value of such budget information placed before the executives day by day constitutes a distinctive budgetary control.

The daily report form may be devised to bring out condensed information covering various phases of operations. Above appears a reproduction of block "B" of the daily report, which shows the departmental appropriations and an analysis thereof.

In some cases the allotment feature may not be advisable and the form may be drawn without this provision being included.

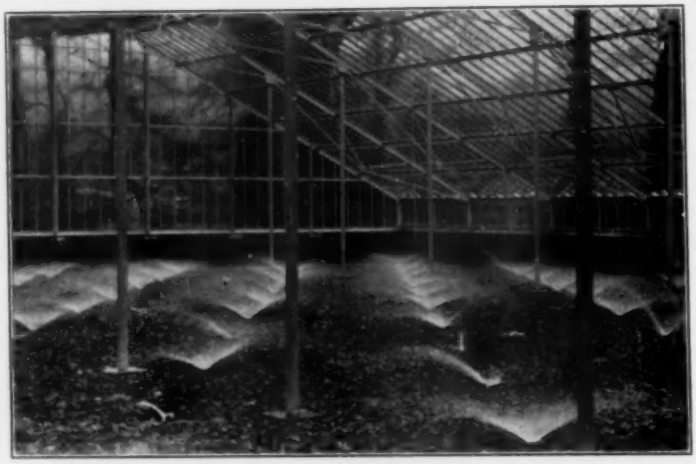
How New York State Cities Operate Public Libraries

IN 33 of 54 cities in New York State, the public libraries are supported entirely by the municipalities themselves, according to data recently collected by the State Bureau of Municipal Information.

In 20 other municipalities, however, the libraries are supported partly by the city and partly by private funds, while in Jamestown the public library is maintained entirely by private money.

Boards of trustees control the public libraries in the cities of that state, but these officials are not selected in the same manner in every municipality. In 19 instances, the mayor appoints all or part of the board of trustees. Where he names only a portion of the board, the library Association selects the remainder, and in 17 places the association alone chooses the trustees. In Newburgh, Port Jervis and Sherrill the trustees must stand election, either at the hands of the entire electorate or else in certain school districts. Glen Cove, on the other hand, places the choice of its public-library trustees in the hands of the city council.

Master Construction Glass-Overs for Sludge Beds



Perfect Control of Sewage Odors Accomplished at Totowa, N. J.

THE proximity of the Disposal Plant to residences, a main highway, and a bathing beach, made necessary not only a high degree of purification, but also a freedom from any possibility of objectionable odors.

To accomplish this, all sludge beds and sprinkling filters were covered with Master Construction Glass Overs. Not only does this give control of odors, but increases the drying efficiency by at least four.

In the usual open bed, about 6 dryings are secured, (in the vicinity of New York City), while in the Glass Overs, anywhere from 17 to 25.

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Do you mention THE AMERICAN CITY when writing? Please do.

768 Municipalities in United States Now Protected by Zoning Ordinances

By NORMAN L. KNAUSS

MORE than 37,000,000 people, residing in 768 cities, towns and villages, comprising three-fifths of the urban population of the United States, now have the protection afforded by zoning regulations, according to the results of a survey just completed by the Division of Building and Housing of the Department of Commerce.

Viewing the progress of zoning in the United States from the standpoint of ordinances adopted, the eight zoned cities which were zoned up to the end of 1916 were augmented to 38 in 1920. The number of zoned municipalities was doubled in 1921, the total being 76. The numbers zoned in subsequent years were: 101 in 1922; 106 in 1923; 76 in 1924; 110 in 1925; 97 in 1926; 107 in 1927; 89 in 1928, and 6 since January 1, 1929.

Progress During 1928

During 1928, in addition to the 89 cities, towns and villages which were reported to the Division of Building and Housing as having zoned during that year, 101 other municipalities were reported as having either adopted more comprehensive zoning ordinances or amended existing ordinance thereby making their zoning more effective.

South Dakota and Idaho were added during the year to the states having zoned municipalities, when four cities in the former and three cities of the latter adopted zoning ordinances. Maryland and Georgia showed progress in county zoning. Prince Georges and Montgomery counties, Maryland, put comprehensive zoning ordinances into effect in areas adjacent to the city of Washington, D. C., and Glynn county, Georgia, adopted such an ordinance applying to its entire area. Township zoning in Pennsylvania has shown progress, with a comprehensive zoning ordinance for Radnor Township added in 1928.

Zoned Municipalities Grouped According to Population

In grouping the zoned municipalities according to population it was found that 56 of the 68 largest cities, having over 100,000 population (1920 census) were zoned. The zoned municipalities in the population groups total as follows:

56 cities having over 100,000 population;
79 cities having less than 100,000, but more than 40,000 population;
86 cities and towns, having less than 40,000, but more than 20,000 population;
97 municipalities having less than 20,000, but more than 10,000 population;
134 municipalities having less than 10,000, but more than 5,000 population;
89 municipalities having less than 5,000, but more than 3,000 population;
122 municipalities having less than 3,000, but more than 1,000 pop.; and
105 municipalities having less than 1,000 population.

Majority of Zoning Ordinances Are Comprehensive

An examination of the zoning ordinances of the 768 municipalities noted in the survey disclosed that 483 were comprehensive in scope, regulating the use, height and area of buildings. Of the 285 other zoning ordinances, most controlled the use to which buildings and premises could be put, although 46 of the number also controlled the area of buildings and 10 others controlled the use and height of buildings.

Few Changes Made in Zoning Ordinances

Questionnaires were sent to all municipalities throughout the United States having authority to zone under state zoning enabling acts. Most of the municipalities that had enacted zoning ordinances prior to 1928 reported that the early zoning ordinances were still in effect. A few cities stated that minor changes had been made in their zoning ordinances, as, for instance, the extending of the boundaries of the various districts, principally in regard to the use districts, wherein the use of buildings and grounds were controlled. A few others reported having revised their zoning ordinances, as for example, enacting a comprehensive zoning ordinance regulating the use, height and area of buildings, taking the place of an ordinance previously adopted which only controlled the use to which buildings could be put.

Considerable zoning activity was indicated by the returns from municipalities not yet zoned, and in returning the questionnaires, many of the city officials asked for information on the subject.

The following is a complete list of zoned municipalities reported in the survey, arranged by states, with details as to the character of the ordinances and the year during which they were adopted and subsequently amended.

Abbreviations

The initial letters indicate the kind of zoning ordinance in effect.

"C" indicates a comprehensive zoning ordinance regulating the use, height and area of buildings.

"U" indicates a zoning ordinance regulating the use made of buildings and grounds.

"UA" indicates a zoning ordinance regulating the use and area of buildings and grounds.

"UH" indicates a zoning ordinance regulating use and height.

"I" indicates an interim ordinance.

The numerals indicate the year of adoption of the zoning ordinance and subsequent amendment.

ALABAMA
Birmingham....C. '26, '27
Fairfield.....U. '26
Mobile.....C. '27, '28
Montgomery....U. '24

ARIZONA
Chandler.....C. '26
Tucson.....I. '27

ARKANSAS
Little Rock.....U. '24
Pine Bluff.....U. '25

CALIFORNIA
Alameda.....C. '19, '21, '23, '28
Altadena.....U. '27
Albany.....U. '24
Anaheim.....U. '28
Arcadia.....C. '26
Bakersfield.....U. '23, '27
Berkeley.....U. '20
Beverley Hills U.A. '27, '28
Burbank.....U.H. '23
Burlingame...U.H. '23
Calipatria....U.A. '24, '29
Chula Vista..U.A. '27, '28
Compton.....U. '27
Coronado.....C. '20
Culver City..U.A. '22, '26
Daly City.....U. '25, '27
Davis City.....C. '26
Delano.....C. '27
Emeryville.....U. '16, '25, '26
Exeter.....U. '25
Fresno.....U. '23
Glendale.....U. '22
Hollydale.....U. '27
Inglewood.....U. '24, '27, '28
Lindsay.....I. '25
Long Beach....C. '21, '22, '25
Los Angeles....U. '09, '16, '21, '22
Los Angeles Co.....U.A. '27
Los Gatos.....U. '28
Mayfield*.....C. '24
Monrovia.....U. '13, '23, '25 '27, '28
Montebello.....U. '29
Monterey.....C. '27
Oakland.....U. '19
Oceanside.....U. '28
Oroville.....U. '28
Pacific Grove...U. '28
Pala Alto.....C. '18, '22, '28
Pasadena.....C. '22, '24, '27, '28
Petaluma.....U. '25, '26
Piedmont.....U. '17, '25
Pittsburgh..U. (I.) '23
Pomona.....U. '17, '20
Redonoo Beach.U. '13
Redlands.....U. '27
Redwood City..C. '21, '25
Reedley.....U. '23
Richmond.....U. '23, '24, '28
Riverside.....C. '25
Sacramento.....C. '17, '19, '23, '29
Salinas.....U.A. '27
San Bruno.....U. '22
*Now part of Palo Alto.
San Buenaventura.....C. '24
San Diego.....U. '23
San Francisco...U. '21
San Gabriel....U. '22, '24, '25
San Leandro..U.A. '25
San Marino....U. '25, '28
San Mateo.....U. '22, '27
San Rafael...U.A. '24
Santa Ana.....U. '27
Santa Barbara..C. '20, '22, '23, '25, '27
Santa Clara....C. '25
Santa Cruz.....U. '24
Santa Monica...U. '22
Selma.....U. '23
Sierra Madre...U. '23
So. Pasadena..U.H. '23
South San Francisco.....U. '25
Stockton.....U. '23
Sunnyvale.....C. '26
Torrance.....U.H. '23
Turlock.....U. '17, '21
Venice.....U. '23
Visalia.....U. '24
W. Hollywood..U. '27
Whittier.....U. '23, '28

COLORADO
Boulder.....C. '28
Colorado Spgs..C. '25, '27
Denver.....C. '25, '26, '28
Grand Junction.C. '28
Pueblo.....U. '23

CONNECTICUT
Bridgeport.....C. '25, '26
Darien.....C. '25
East Hartford..C. '27
Enfield.....C. '25
Fairfield.....C. '25
Greenwich.....C. '26, '27
Hartford.....C. '25, '26
Meriden.....C. '27
Middletown....C. '27
New Britain....C. '25
New Haven....C. '26
New London....C. '28
Norwich.....C. '25
Stamford.....C. '26
Stratford.....C. '28
Waterbury.....C. '28
West Hartford..C. '24

DELAWARE
Wilmington.....C. '24

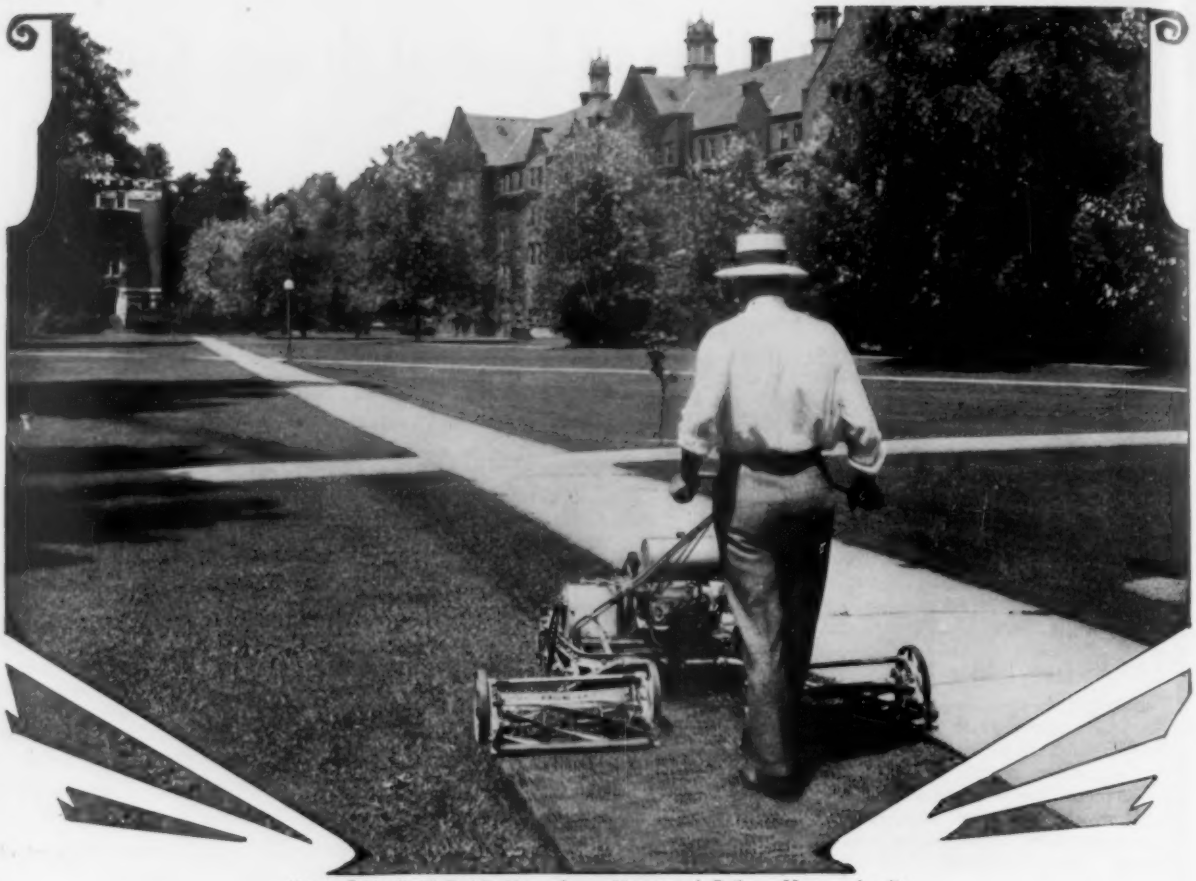
DISTRICT OF COLUMBIA
Washington....C. '20

FLORIDA
Bradenton.....U. '23, '26
Fort Lauderdale.C. '26
Fort Myers.....C. '26
Jacksonville....C. '25
Lake Worth....C. '27
Lakeland.....U. '25
Orlando.....C. '24, '27
Seabreeze.....C. '24
Sebring.....U. '26
St. Augustine...C. '25
Vero Beach.....C. '26
W. Palm Beach..C. '26

GEORGIA
Atlanta.....C. '22
Glynn County..C. '28
Savannah.....C. '25
Waycross.....U.A. '29

IDAHO
Boise.....C. '28
Idaho Falls...U.A. '28
Twin Falls....U.A. '28

ILLINOIS
Alton.....C. '28
Arlington Heights....U.A. '27
Aurora.....C. '23, '26
Barrington.....C. '26
Batavia.....U. '24
Belvidere.....U. '27
Berwyn.....C. '23
Blue Island.....C. '26
Brookfield.....C. '24
Carbondale.....U. '22
Champaign.....C. '26
Chicago.....C. '22, '27
Cicero.....C. '23
Clarendon Hills.C. '26
Crystal Lake....C. '27
Danville.....C. '26
Decatur.....C. '22, '28
Deerfield.....C. '24
De Kalb.....C. '26
Des Plaines...U.A. '23
Downers Grove..C. '23, '25
Dwight.....U. '26
Elgin.....C. '28
Elmhurst.....C. '24, '27, '28
Evanston.....C. '21, '27
Floosmoor.....C. '25
Franklin Park U.H. '26
Freeport.....C. '26



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Glencoe . . . . . C. '21
Glen Ellyn . . . . . C. '23
Glenview . . . . . C. '24
Harvey . . . . . C. '26
Highland Park . . C. '22, '26
Hinsdale . . . . . C. '23
Homewood . . . . . C. '26, '28
Jacksonville . . . . C. '24, '26
Kenilworth . . . . . C. '23, '24, '26
La Grange . . . . . C. '23, '25
La Grange Park . . C. '25
Lake Bluff . . . . . C. '22, '23, '24
Lake Forest . . . . C. '23, '28
La Salle . . . . . C. '27
Libertyville . . . . . C. '25
Lombard . . . . . C. '24
Lyons . . . . . C. '24
Maywood . . . . . C. '22
Melrose Park . . . C. '24
Mount Prospect . C. '23
Mundelein . . . . . C. '25
Naperville . . . . . C. '24
Northbrook . . . . C. '26
North Chicago . . C. '26
North Riverside . C. '26
Oak Lawn . . . . . C. '27
Oak Park . . . . . C. '21, '23, '28
Palatine . . . . . C. '26
Palos Park . . . . . C. '24
Park Ridge . . . . . C. '22, '28
River Forest . . . . C. '22
Riverside . . . . . C. '22
Rockford . . . . . C. '23, '27
Springfield . . . . . C. '24
Saint Charles . . . C. '28
Tessville . . . . . C. '27
Villa Park . . . . . C. '23
Waukegan . . . . . C. '24
Western Springs . C. '23
Wheaton . . . . . C. '23
Wilmette . . . . . C. '22
Winnetka . . . . . C. '22, '24, '28

INDIANA

Anderson . . . . . C. '23
Elkhart . . . . . C. '25
Evansville . . . . . C. '25, '28
Fort Wayne . . . . C. '28
Gary . . . . . C. '25
Highland . . . . . C. '26
Indianapolis . . . . C. '22
Kokomo . . . . . C. '25
Marion . . . . . C. '28
Michigan City . . C. '26
Mishawaka . . . . . C. '25, '27
Muncie . . . . . C. '23
Richmond . . . . . C. '23
South Bend . . . . C. '23
Terre Haute . . . . C. '25, '26
Valparaiso . . . . . C. '25
W. Lafayette . . . C. '27

IOWA

Ames . . . . . C. '25
Boone . . . . . C. '27, '28
Cedar Rapids . . . C. '25, '26
Clinton . . . . . U. '25
Council Bluffs . . C. '27
Davenport . . . . . C. '25
Des Moines . . . . C. '26, '27
Harlan . . . . . U.A. '27
Iowa City . . . . U.A. '25
Mason City . . . . C. '28
Newton . . . . . C. '27
Red Oak . . . . . U.A. '25
Sioux City . . . . U.A. '28
Waterloo . . . . . U. '24

KANSAS

Abilene . . . . . C. '27
Belleville . . . . . U. '27
Cherryville . . . . . U. '27
Coffeyville . . . . U.A. '26
Dodge City . . . . C. '27
Emporia . . . . . U.A. '27
Garden City . . . . C. '26
Great Bend . . . . C. '26
Herington . . . . . C. '25
Hutchinson . . . . C. '21, '28
Independence . . . U. '28
Kansas City . . . . C. '24
Kingman . . . . . U. '26
Lawrence . . . . . C. '26
Manhattan . . . . . U. '25, '26, '27
Osage City . . . . . C. '28
Ottawa . . . . . C. '27, '28
Pittsburg . . . . U.A. '26
Pratt . . . . . C. '27
Salina . . . . . U.A. '25
Topeka . . . . . C. '23, '25, '28
Wichita . . . . . U.A. '22, '27, '28
Winfield . . . . . C. '27

KENTUCKY

Lexington . . . . . U. '27
Louisville . . . U. (I.) '27

LOUISIANA

Shreveport . . . . . C. '25

MAINE

Mount Desert . . U. '28
Portland . . . . . C. '26

MARYLAND

Baltimore . C.U. (I.) '23, '25, '26
Montgomery Co. C. '28
Prince Georges Co. . . . . C. '28

MASSACHUSETTS

Agawam . . . . . C. '28
Andover . . . . . I. '27
Arlington . . . . . C. '24, '28
Belmont . . . . . C. '25
Boston . . . . . C. '04, '23, '24, '25, '26, '27, '28
Brockton . . . . . C. '20
Brookline . . . . . C. '22, '24, '28
Cambridge . . . . . C. '24
Chelsea . . . . . U. '24
Concord . . . . . C. '28
Dedham . . . . . U. '24
East Longmeadow . . . . . C. '28
Everett . . . . . C. '26, '28
Fall River . . . . . C. '27
Fairhaven . . . . . C. '26
Falmouth . . . . . C. '26, '28
Gloucester . . . . . C. '26, '27
Haverhill . . . . . C. '25
Holyoke . . . . . U. '23, '27
Hudson . . . . . U. '27
Lexington . . . . . C. '24, '29
Lincoln . . . . . C. '29
Longmeadow . . . . C. '22
Lowell . . . . . C. '22, '26
Lynn . . . . . C. '24, '25, '26
Malden . . . . . C. '23, '26
Marblehead . . . . C. '27, '28
Marlborough . . . I. '27
Marshfield . . . . U. '26
Medford . . . . . C. '25
Melrose . . . . . C. '24, '25, '26, '27, '28
Milton . . . . . U.A. '22, '26
Needham . . . . . C. '25, '26
New Bedford . . . C. '25, '27, '28
Newburyport . . . I. '25
Newton . . . . . C. '22, '25, '26
North Adams . . . C. '22, '25, '27
Northampton . . . I. '27
Norwood . . . . . C. '27
Oak Bluffs . . . . I. '27
Paxton . . . . . U. '24
Petersham . . . . I. '27
Pittsfield . . . . . C. '27
Reading . . . . . C. '26
Revere . . . . . U. (I.) '25
Salem . . . . . U. '25, '27, '28
Saugus . . . . . C. '29
Somerville . . . . . C. '25
Springfield . . . . . C. '21, '22, '23, '24
Stoneham . . . . . C. '25, '26, '27, '28
Swampscott . . . U. '24
Taunton . . . U. (I.) '25
Wakefield . . . . . C. '25
Walpole . . . . . C. '25, '28
Waltham . . . . . C. '25
Watertown . . . . . C. '26, '27
Wellesley . . . . . U. '25
Westfield . . . U. (I.) '22
W. Springfield . . C. '23
Weston . . . . . C. '28
Winchester . . . . C. '24, '28
Winthrop . . . . . C. '22, '28
Woburn . . . . . C. '25
Worcester . . . . . U. '23, '24

MICHIGAN

Albion . . . . U. (I.) '26
Ann Arbor . . . . C. '23
Battle Creek . . . C. '24
Belding . . . . . C. '28
Benton Harbor . . C. '25
Dearborn . . . . . U. '22
East Grand Rapids . . . . . C. '22, '24
East Lansing . . . U. '28
Ferndale . . . . . U. '22
Flint . . . . . C. '26, '27
Grand Haven . . . C. '23, '27
Grand Rapids . . . C. '23
Grandville . . . . . U. '22, '28
Grass Lake . . . . U. '27
Grosse Pointe Farms . . . . . C. '28
Grosse Pointe Park . . . . . C. '27, '28
Grosse Pointe Shores . . . . . C. '24
Grosse Pointe Village . . . . . C. '27
Holland . . . . . C. '26
Ionia . . . . . U.A. '27
Ironwood . . . . . I. '25
Jackson . . . . . C. '23, '28
Kalamazoo . . . . . U. '25
Lansing . . . . . C. '27
Marquette . . . . . U. '25
Marshall . . . . . C. '29
Midland . . . . . C. '25
Mt. Pleasant . . . U. '26
Muskegon . . . . . C. '25, '28
Muskegon Heights . . . . . C. '24
No. Muskegon . . . C. '25
Oak Park . . . . . C. '29
Owosso . . . . . C. '25
Saginaw . . . . . C. '27
Saint Joseph . . . . C. '27
Sturgis . . . . . U. '27
Ypsilanti . . . . . C. '25

MINNESOTA

Duluth . . . . . C. '25, '26, '27
Minneapolis . . . . C. '20, '24, '25, '27
Saint Paul . . . . . C. '22

MISSISSIPPI

Yazoo City . . . . U. '28

MISSOURI

Excelsior Spgs. . . C. '28
Independence . . . U. '22
KansasCity . . . . C. '23
Kirkwood . . . . . C. '28
Richmond Heights . . . . . C. '22
Saint Louis . . . . . C. '26, '27, '28
University City . C. '22, '26
Webster Groves . C. '23, '25

NEBRASKA

Fremont . . . . . U.A. '25
Hastings . . . . . U. '28
Kearney . . . . . U.A. '28
Lincoln . . . . . U.H. '26
Omaha . . . . . C. '20, '24
Scottsbluff . . . . . I. '26
University Place* . . . . . U.H. '26

NEVADA

Reno . . . . . U. '24

NEW HAMPSHIRE

Keene . . . . . C. '27
Manchester . . . . C. '27
Portsmouth . . . . C. '27

NEW JERSEY

Audubon . . . . . C. '24
Beachwood . . . . . U. '21
Belleville . . . . . U. '23
Bloomfield . . . . . U. '23
Bogota . . . . . C. '21
Boonton . . . . . C. '22
Bound Brook . . . C. '21
Bradley Beach . . U. '23
Caldwell . . . . . C. '21, '28
Cliffside Park . . . C. '20
Clifton . . . . . U. '21, '28
Collingswood . . . C. '28
Cranford Twp. . . C. '22
Cresskill . . . . . U. '22
Deal . . . . . C. '23
Demarest . . . . . U. '22
Dumont . . . . . U. '22
Dunellen . . . . . C. '23, '24
East Orange . . . . C. '21, '25, '28
East Paterson . . . U. '28
Edgewater Park C. '28
Elizabeth . . . . . C. '22, '23, '24
Englewood . . . . . C. '23
Essex Fells . . . . . U. '28
Fairview . . . . . U. '21
Fanwood . . . . . U. '24
Fort Lee . . . . . C. '21, '28
Freehold . . . . . C. '24
Garwood . . . . . C. '22
Glen Ridge . . . . . C. '21, '23
Glen Rock . . . . . C. '23, '24
Hackensack . . . . C. '22
Haworth . . . . . U. '21
Hawthorne . . . . . U. '22
Highland Park . . C. '23, '24
Hightstown . . . . U. '22
Hillside . . . . . C. '22
Hoboken . . . . . C. '22
Hohokus . . . . . C. '23
Hopatcong . . . . . C. '28
Irvington . . . . . C. '22
Jersey City . . . . . C. '22
Kearny . . . . . C. '22
Lakewood . . . . . C. '23, '28
Leonia . . . . . U. '21
Linden . . . . . U.H. '21
Long Branch . . . U. '21
Lyndhurst Twp. U. '22
Madison . . . . . C. '22, '24, '25
Maplewood . . . . U. '21
Maywood . . . U.A. '22
Merchantville . . U. '23, '26, '27
Metuchen . . . . . U. '25
Millburn . . . . . C. '25, '27, '28
Montclair . . . . . C. '21, '24, '28
Morristown . . . . C. '28
MountainLakes C. '27
Newark . . . . . C. '19, '20
New Brunswick . C. '24
No. Plainfield . . C. '23
Norwood . . . . . U. '23
Nutley . . . . . C. '22
Orange . . . . . C. '22
Passaic . . . . . C. '22, '24
Paterson . . . . . C. '21, '24
Plainfield . . . . . C. '23, '24
Pompton Lakes U. '23
Rahway . . . . . C. '20, '21
Ridgefield Park . C. '23, '24
Ridgewood . . . . . C. '23, '24, '28
Roselle . . . . . C. '22
Roselle Park . . . . C. '21, '24
Rutherford . . . . . C. '22
Sea Girt . . . . . U. '20
South Orange Township . . . . C. '22
Summit . . . . . C. '23, '28
Tenafly . . . . . U.A. '22
Totowa . . . . . U. '22
Trenton . . . . . U. '27
Ventnor . . . . . C. '28
Verona . . . . . U. '22
Weehawken Twp. '23
Westfield . . . . . C. '21, '28
West Hoboken . C. '22
West New York . C. '22
West Orange . . . C. '21

NEW YORK

Akron . . . . . U.H. '26
Albany . . . . . C. '24, '26
Amsterdam . . . . . C. '26
Ardsley . . . . . C. '27
Asharoken . . . . . C. '27
Auburn . . . . . U. '25
Baldwinsville . . . C. '25
Batavia . . . . . C. '28
Binghamton . . . . C. '22, '23, '24
Blooming Grove . U. '28
Briarcliff Manor . C. '28
Brightwaters . . . C. '22
Brockport . . . . . U. '28
Bronxville . . . . . C. '22, '23, '27, '28
Buffalo . . . . . C. '22, '23, '25
Camden . . . . . U. '28
Canastota . . . . . U. '28
Cayuga Heights . U. '25
Cazenovia . . . U.A. '28
Cedarhurst . . . . C. '25
Cortland . . . . . U. '28
Dansville . . . . U.A. '27
Dobbs Ferry . . . C. '24, '27, '28
East Aurora . . . . U. '28
Eastchester Town . . . . . U. '23, '27
East Hampton . . C. '25
East Rockaway . C. '24, '28
Elmsford . . . . . C. '24, '27
Endicott . . . . U.A. '22
Farmingdale . . . U. '22
Floral Park . . . U. '22, '28
Freeport . . . . . C. '24
Fulton . . . . . C. '22
Garden City . . . C. '22, '24
Glen Cove . . . . . C. '26
Glens Falls . . . . U. '25, '28
Gloversville . . . C. '21, '22, '23, '24, '25, '26, '28
Goshen . . . . . U. '27
Grand View . . . U. '26
Granville . . . . . U. '28
Great Neck . . . U. '22, '23
Greenburgh . . . . C. '24
Hamburg . . . . . C. '27
Harrison . . . . . C. '23, '28
Hastings . . . . . C. '23, '28
Hempstead . . . . C. '22, '27
Hudson . . . . . U. '22, '23
Irvington . . . . . U. '22, '23
Ithaca . . . . . C. '23
Jamestown . . U.A. '22, '23, '24, '27
Kenmore . . . . . C. '24, '28
Kensington . . . . C. '24, '26
Kingston . . . U.A. '25, '28
Lake Placid . . . U. '28
Lakewood . . . U.A. '27
Lancaster . . . . . C. '28
Larchmont . . . . C. '21
LaSalle* . . . . . C. '24
Lawrence . . . . . C. '23
Long Beach . . . U. '22
Lowville . . . . . U. '25
Lynbrook . . . . . C. '23, '24, '26
Malone . . . . . U. '27
Malverne . . . . . C. '26
Mamaroneck . . . C. '25, '28
Mamaroneck Town . . . . . C. '22
Medina . . . . . C. '28, '29
Middletown . . . . C. '28
Mill Neck . . . . . C. '26, '27, '28
Mineola . . . . . U. '21
Monroe . . . . . U. '28
Mount Kisco . . . C. '28
Mt. Morris . . . U.A. '28
Mt. Pleasant . . . C. '27, '28
Mount Vernon . C. '22, '27
Newburgh . . . . . C. '23
New Castle Town . . . . . C. '28
New Rochelle . . . C. '21, '25
New York . . . . . C. '16, '24
Niagara Falls . . . C. '20
North Pelham . . . C. '21, '28
North Tarrytown . . . . . U.A. '26
North Tonawanda . . . . . U. '27
Old Westbury . . . C. '26
Oneida . . . . . U. '24
Orchard Park . . . U. '26
Ossining . . . . . U. '21, '27
Owego . . . . . U. '26
Patchogue . . . . . C. '25
Pelham . . . . . C. '24, '28
Pelham Manor . U. '21, '22, '24, '28
Penn Yan . . . . . U. '25
Perry . . . . . U. '26
Plandome . . . . . C. '24
Pleasantville . . . C. '27, '28
Port Chester . . . C. '22, '27
Potsdam . . . U.A. '25
Poughkeepsie . . . C. '27
Rochester . . . . . U. '19, '20
Rockville Center . . . . . C. '24, '28
Rome . . . . . U. '24, '26
Rye . . . . . C. '23, '28
Saltaire . . . . . C. '22
Sands Points . . . U. '22, '27
Saratoga Spgs. . U. '23, '24
Scarsdale . . . . . C. '22
Schenectady . . . . C. '27
Sea Cliff . . . . . C. '27
Seneca Falls . . . U. '25
Sherrill . . . . . U. '26
Skaneateles . . U.A. '26
South Nyack U. (I.) '27
Spring Valley . . . U. '26
Suffern . . . . . U. '28
Syracuse . . . . . U. '22
Tarrytown . . . . . U. '23
Ticonderoga . . . . C. '26
Troy . . . . . C. '22
Tuckahoe . . . . . C. '23, '28

*Now part of city of Niagara Falls.

Union Corners* . U. '23
Upper Nyack . . . C. '28
Utica . . . . . C. '23, '24
Valley Stream . . C. '26
Warsaw . . . . . U.A. '28
Warwick . . . . . U. '28
Washingtonville . C. '28
Watertown . . . . . U. '22, '27
Waverly* . . . . . U. '23
White Plains . . . C. '20, '27, '28
Williston Park . . C. '27, '28
Wilmont* . . . . . U. '23
Wilson . . . . . C. '28
Woodury . . . . . U. '28
Yonkers . . . . . C. '20, '28

NORTH CAROLINA

Durham . . . . . C. '26
Greensboro . . . . C. '26, '27
High Point . . . . C. '26, '28
Raleigh . . . . . C. '23
Rocky Mount . . . C. '28
Southern Pines . . '26

NORTH DAKOTA

Bismarck . . . . . C. '24
Fargo . . . . . C. '25, '27
Jamestown . . . U. '25
Minot . . . . . C. '27

OHIO

Akron . . . . . C. '22, '28
Ashland . . . . . C. '26
Ashtabula . . . . . C. '23
Bay Village . . . . C. '22
Bexley . . . . . C. '23
Bratenahl . . . . . C. '23
Brooklyn Heights . '27
Canton . . . . . C. '28
Cincinnati . . . . . C. '24
Cleveland Heights . . . . . C. '21, '22, '23, '24, '25, '26, '27
Columbus . . . . . C. '23, '27, '28
Dayton . . . . . C. '26
East Cleveland . . C. '19, '22
Elmwood . . . . . U. '28
Elyria . . . . . C. '27, '29
Euclid Village . . C. '22, '27
Grandview Heights . . . . . C. '22, '23
Hamilton . . . . . C. '26
Idlewood . . . . . C. '22
Lakewood . . . . . C. '22, '24, '25, '26, '27, '28
Lima . . . . . U. '24
Lorain . . . . . C. '26
Madison . . . . . C. '23
Mansfield . . . U. (I.) '26
Marion . . . . . U. '25, '27, '28
Maumee . . . . . C. '25
Mt. Healthy . . . C. '25, '28
Newburgh Heights . . . . . C. '28
Newton Falls . . . C. '27
Oakwood . . . . . C. '25
Oberlin . . . . . C. '27, '28
Painesville . . . . C. '27
Poland . . . . . UA. '23
Reading . . . . . I. '28
Shaker Heights . C. '27
Toledo . . . . . C. '23
Warren . . . . . C. '23, '25
Westerville . . . . C. '28
Willoughby . . . . U. '21
Worthington . . . C. '23 '28
Wyoming . . . . . C. '26
Youngstown . . . I. '28

OKLAHOMA

Blackwell . . . . . C. '26
El Reno . . . . . I. '27
Frederick . . . . . U. '25
Norman . . . . . U. '24
Oklahoma City . U. '23, '28
Ponca City . . . . C. '27
Tulsa . . . . . C. '23

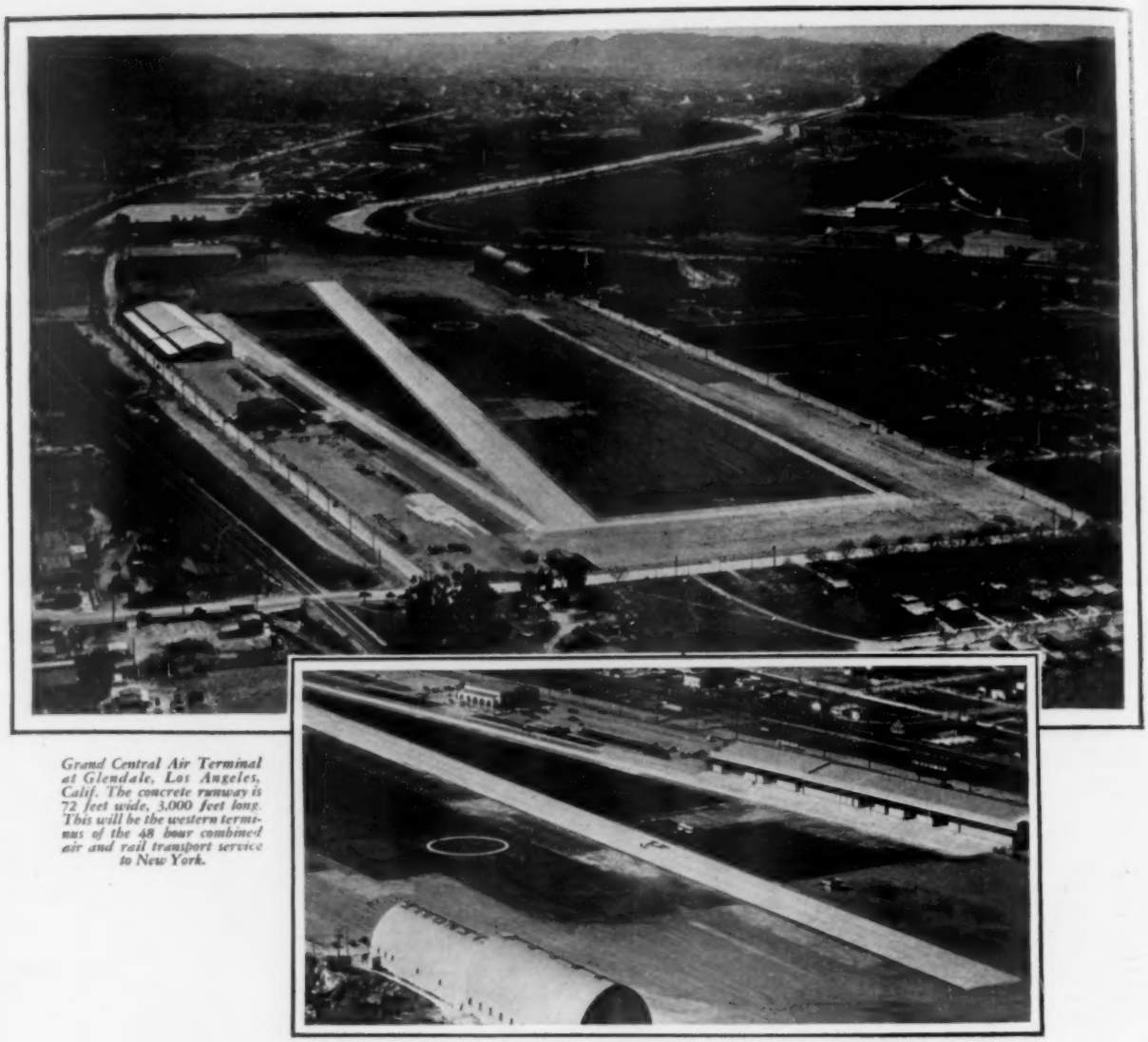
OREGON

Medford . . . . . C. '23
Portland . . . . . U. '24
Salem . . . . . U. '26

PENNSYLVANIA

Aldan . . . . . U. '25
Altoona . . . . . C. '28
Avalon . . . . . C. '26
Beaver . . . . . U. '25, '27
Bellevue . . . . . C. '25
Ben Avon . . . . . C. '24
Bethlehem . . . . . C. '26
Chester . . . . . C. '25, '27
Connellsville . . . U. '24, '27
Crafton . . . . . C. '26
Dormont . . . . . C. '27
Easton . . . . . C. '28
Edgewood . . . . . C. '25, '28
Edgeworth . . . . . U. '25
Emsworth . . . . . C. '25, '28
Farrell . . . . . U. '27
Haverford Twp. C. '25
Hazleton . . . . . U. '27
Ingram . . . . . C. '25, '28
Johnstown . . . . . C. '26, '27
Lansdowne . . . U.A. '26
Lower Merion Township . . . C. '27
Monaca . . . . . C. '25
Monessen . . . . . C. '25, '28
Mt. Lebanon Township . U.A. '26
Narberth . . . . . C. '24, '25
New Castle . . . . C. '25
North Braddock C. '28

*Unincorporated parts of Eastchester Town.



Grand Central Air Terminal at Glendale, Los Angeles, Calif. The concrete runway is 72 feet wide, 3,000 feet long. This will be the western terminus of the 48 hour combined air and rail transport service to New York.

Some Airport Necessities . . . . .

Concrete paved runways are a necessity for every airport that handles regular mail and passenger service. Soft runway surfaces are dangerous for aircraft. Takeoff and landing speeds exceed those normal to motor cars and trucks on the finest paved highways.

Nothing less rigid and strong than concrete can be expected to render satisfactory service under the landing impact of heavy planes. The weight is largely concentrated on the two wheels. Airports should have convenient and firesafe buildings for servicing and storing aircraft, and for the needs of passengers. Wide concrete paved streets and highways should connect the airport with nearby cities, so that valuable time gained by air transport may not be wasted by congested surface conditions.

Airports equipped with these necessities will attract business.

PORTLAND CEMENT *Association*

Concrete for Permanence CHICAGO

Norwood.....U.A. '27
Oakmont.....C. '27
Oil City.....I. '24, '27
Osborne.....U.A. '27
Pittsburgh.....C. '23, '27
Prospect Park..C. '25
Radnor Twp....C. '28
Scranton.....C. '24
Sewickley.....U. '25
State College...C. '27
Swarthmore....C. '28
Swissvale.....U.A. '25
Trafford.....C. '28
Westview.....C. '25, '27
Wyomissing....C. '25

RHODE ISLAND

Barrington.....C. '26
Cranston.....C. '24
East Providence.C. '26, '28
Newport.....U. '22
North Smithfield.C. '26
Pawtucket.....C. '26, '28
Providence.....C. '22, '28
Westerly.....C. '25
Woonsocket.....C. '23

SOUTH CAROLINA

Columbia.....C. '24

SOUTH DAKOTA

Huron.....C. '28
Mitchell.....C. '28
Sioux Falls.....C. '28
Watertown.....C. '28

TENNESSEE

Chattanooga....C. '27
Jackson.....C. '28
Knoxville.....C. '28
Memphis.....C. '22, '25, '27, '29

TEXAS

Graham.....U.(I.) '28

UTAH

Logan.....U.A. '27
Provo City.....C. '26
Salt Lake City..C. '20, '27, '28

VIRGINIA

Hopewell.....U. '27
Lynchburg.....I. '26
Norfolk.....C. '24, '27
Petersburg.....U. '22, '28
Richmond.....C. '22, '23, '27, '28
Roanoke.....U. '23
Staunton.....C. '27, '28
Suffolk.....U. '24

WASHINGTON

Olympia.....U.A. '23
Seattle.....C. '23
Tacoma.....U. '19, '27

WISCONSIN

Antigo.....C. '27
Appleton.....C. '23, '28
Beloit.....C. '24, '26
Cedarburg.....C. '27
Cudahy.....U. '19
Eau Claire.....C. '23
Green Bay.....C. '25
Janesville.....C. '22, '23, '27
Kenosha.....C. '24, '28
Kenosha Co.....C. '26
Kiel.....C. '28
LaCrosse.....U. '21, '27
Madison.....C. '22, '27
Menasha.....U. '23
Milwaukee.....C. '20, '24, '26, '27, '28
Milwaukee Co..U. '27
Neenah.....U. '15
Oconomowoc...C. '26, '28
Oshkosh.....C. '26
Racine.....U. '16
Sheboygan.....C. '26
Shorewood.....U. '19
Stevens Point..I. '28
Sturgeon Bay...C. '27
Two Rivers.....C. '26
Waukesha.....C. '23
Wausau.....C. '24
Wauwatosa.....C. '21, '22, '23, '24, '25 '26, '27, '28
West Allis.....U. '25
Whitefish Bay..C. '22, '27, '28

Prepared by
FRANK B. WILLIAMS
Author of "The Law of City Planning and Zoning"

ZONING and PLANNING NOTES

From Data collected by the Zoning Committee of New York (233 Broadway)

Recent Zoning Laws and Ordinances

SACRAMENTO, CALIF.—Ordinance, April 12, 1929.

GEORGIA.—Constitutional amendment to Art. 3, Sec. 7, ratified by popular vote; see LAWS, 1927, p. 127 (No. 393).

ATLANTA, GA.—Ordinance, December 21, 1928.

MINNESOTA.—Statute, 1929, ch.—.

LAKE GIRARDEAU, Mo.—Ordinance, April, 1929.

COLLINGSWOOD,. N. J.—Ordinance, April 22, 1929.

EAST PATERSON, N. J.—Ordinance, November 2, 1928.

EDGEWATER PARK, N. J.—Ordinance, April 29, 1929.

NEW YORK CITY.—Amendment of zoning resolution, creating a retail district; see the *New York Times* for April 19, 1929.

Two Decisions as to Tidelands and Waterfront Boundaries

CALIFORNIA.—*City of Los Angeles* v. *Anderson*, 275 Pac. Rep. 789.—In actions by the city as grantee from the state of tidelands in trust for purposes of navigation and commerce to recover possession of land asserted to be reclaimed tideland, and to which defendants claimed title by adverse possession, where accretion had formed on tideland because of falling and dumping of material into the water from neighboring bluffs which lodged against a government breakwater and not from the ordinary wash of the ocean, it was held that such parcel did not attach as alluvion to the ownership of the upland, but retained its character as public land. For the owner of upland to be entitled to accretions, they must have resulted from natural causes and been of gradual and imperceptible formation. Where accretions result from artificial means, such as the erection of a structure below ordinary high-water line, a case of purpresture or encroachment is made out, and the deposit of alluvion caused by such structure does not inure to the benefit of the upland owner, but the right to recover possession thereof is in the state or its successors in interest.

Property held by the state or any political subdivision thereof in trust for public use cannot be gained by adverse possession, and the Statute of Limitations does not apply to an action to recover such property from one using it for private purposes not consistent with public use; hence no title to tidelands could be acquired by adverse possession against the state or its grantee.

CALIFORNIA.—*Muchenberger* v. *City of Santa Monica*, 275 Pac. Rep. 803.—It is a matter of common and judicial knowledge that tide lines fluctuate. Where the owners of adjoining property, uncertain as to the true boundary, agree on its location, mark it, occupy it on each side up to the place fixed, and acquiesce in its location for the statutory period of limitations or under circumstances that substantial loss would be caused by change, such a line becomes in law the true line, regardless of the accuracy of the agreed location.

A municipality, as well as any other owner, may by agreement determine a boundary line of its property.

The above doctrines apply to tidelands in which natural causes have changed the actual tidal lines, so that they vary materially from the lines fixed by agreement.

Filling-Stations

CONNECTICUT.—*De Flumeri* v. *Sunderland, Mayor*, 145 Atl. Rep. 48.—A mayor may deny an application for a certificate of approval of the location for a gasoline filling-station under Pub. Act 1927, ch. 245, if in his judgment the best interests of the community require denial. And the court may set aside his act if so unreasonable as to justify legislative interference.

KANSAS.—*Hazlett* v. *Morland Refining Co.*, 30 Fed. Rep. (2d Series) 808.—While courts undoubtedly have jurisdiction in proper cases to afford relief, restriction on the location of commercial establishments, such as drive-in gasoline filling-stations, should ordinarily be by zoning ordinance and not by injunction.

RHODE ISLAND.—*Sundlin* v. *Zoning Board of Review of City of Pawtucket*, 145 Atl. Rep. 451.—A zoning ordinance which permits gasoline filling-stations within a given resident district if approved by the Board of Review, demonstrates that exclusion is not essential to the general zoning plan, and that the intent of the zoning ordinance is that the Board should on application make exceptions in favor of such stations within given districts if reasonably consistent with the general welfare. Under the circumstances in evidence in this case, the station in question should have been permitted.

20 Per Cent Protest Clause

NEW YORK.—*Matter of 40th St. and Park Ave., Inc.*, Supreme Court, New County, reported in *New York Law Journal* for April 19, 1929.—The provision that an amendment to a zoning ordinance changing the regulations with regard to a district against which the owners of 20 per cent or more of the frontage proposed to be altered, or that immediately in the rear or directly opposite, shall only be passed by unanimous vote, while in other cases a majority suffices, is valid, and is not an illegal delegation of governmental powers. The protests of the property owners are not conclusive, but may be overridden by the local legislative authority. There is no delegation of power; the action of the property owners is merely a prerequisite to a vote.

Airports

NEW YORK.—*Hesse* v. *Rath, Mayor of City of Utica*, 249 N. Y. 435.—The acquisition of an airport or landing field serves both a public and a municipal purpose; and an indebtedness therefor is incurred for a municipal purpose.*

Assessment of Parks

NEW YORK.—*In re City of New York*, Supreme Court, Kings County, reported in *New York Law Journal* for May 7, 1929.—Property owned by municipalities in a proprietary capacity, as distinguished from lands owned in trust for street purposes, should bear along with the property of other owners its proportionate part of the burdens of public improvements by

* An editorial on this decision will be found in the *New York Law Journal* for December 20, 1928.

The *Restless* Age

CAN we afford to build highways wide enough and safe enough to accommodate properly the nation's scurrying, swarming fleet of twenty-five million cars that crowd our highways this restless age? Thousands of miles of Tarvia roads—smooth, skid-safe and durable, yet economical to build and maintain—answer: "We can."

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which they are benefited within an area of assessment. Park property is an asset, and should bear its share of the expense of public improvements which enhance its market value. The Board of Estimate of New York City acted within its power in fixing the areas of assessment so as to include the park land in question.

Reopening Determination of Board of Appeals

New York.—Matter of Riker v. *Board of Standards and Appeals,* 225 App. Div. 570.—The Board of Standards and Appeals of New York City, which has granted an application under the Building Zone Resolution permitting the erection in a restricted district of a building for business did not have the right, after certiorari proceedings had been instituted, to reopen the proceedings and set aside its former decision. It has no right to review its own decision, and, furthermore, the certiorari order of the Supreme Court had removed the entire proceedings to the jurisdiction of that court prior to the action of the Board of Standards and Appeals.

"Front" Wall

New York.—*Rollins* v. *Armstrong, City Superintendent of Buildings,* 233 N. Y. Supp. 359.—Under a zoning ordinance specifying the height of the "front" wall of a building in a given district, the wall on the street side is the "front" wall, notwithstanding the fact that the holder of the building permit proposes to erect the building with the entrance wall facing the rear of the lot, and the rear wall facing the street.

Non-Conforming Use—Ice Storage and Manufacturing

Ohio.—*State ex rel. City Ice & Fuel Co.* v. *Stegner, Director of Buildings of City of Cincinnati,* Supreme Court, April, 1929. Mandamus.—In a residence district was an ice storage plant, a non-conforming use. The plant contained some refrigerating machinery, of the same kind that would be used in the manufacture of ice, but of an extent appropriate to, and actually used exclusively for, the refrigeration incident to the storage of ice, and no ice was being manufactured in the plant. The company desired to extend the plant for the purpose of equipping the plant for ice manufacturing. The ordinance permitted an extension of a non-conforming use, but not both an extension and a substitution. The claim of the city was that, even acknowledging that the type of refrigerating machinery used for storage and that used for manufacturing were similar and were used on the same principle, still an extension for ice manufacturing would be both an extension and a substitution and therefore contrary to the ordinance.

The Court held that manufacturing ice is a different business from storing ice and that, consequently, the proposed extension was both an extension and a substitution and, consequently, the Board of Appeals was not under any duty to permit it, and that in the absence of proof that the restrictions of the ordinance bore no real or substantial relation to the public health, and so forth, such restrictions are constitutional.

Title of Act—Constitutionality of Zoning—Reasonableness of Boundary Lines—Legislative Discretion — Undertaking Establishment

Oklahoma. — Supreme Court, April, 1929.— The title to Laws 1923, ch. 178, is "An Act relating to the powers of cities with respect to buildings, cities, areas, trades and industries, authorizing the creation of zoning districts and declaring an emergency." *Held,* that such act includes but one subject, namely, the zoning of municipalities, and the provisions of said bill relate only to said subject.

It is not necessary for the title of an act to embrace an abstract of its contents, and if an act has numerous provisions and such provisions have one general object, the title is sufficient if it fairly indicates the general purpose of the act.

The ordinance is a comprehensive zoning regulation, and is not contrary to the state or national Constitution as against a funeral home in a residential district.

Where the validity of a legislative classification is attacked as unreasonable, and is fairly debatable, the legislative judgment must control.

The boundary line of a zoning district must be fixed in some locality, and is not to be held invalid because the property on one side of the line is not very different from that on the other side of it.

While a funeral home may partake of the nature of a profession, it is properly classified as a business.

No legislative powers were delegated by the act to the Board of Adjustment.

Multiple Dwellings Law of New York

After a long conflict, the Legislature of New York has passed a new tenement house law known as the Multiple Dwellings Law.* The law repeals the former tenement house law in so far as New York City is concerned, leaving it in force in Buffalo. It allows greater heights with setbacks, somewhat as in the zoning resolution of New York City, but requires somewhat greater courts and yards in many cases. The so-called apartment hotels are authorized with certain ameliorations.

The Retail District in New York City

The creation of districts especially for retail business under the zoning resolution for New York City is an interesting innovation. A full account of the amendment by which this was accomplished will be found in the *New York Times* of April 19, 1929; and an article descriptive of the district by Edward M. Bassett appears in the New York papers of April 27 and May 4, 1929. An article on this subject will also be found in the *Real Estate Magazine,* of New York, of April 10, 1929.

Recent Publications

Zoning Progress in the United States.—The Department of Commerce of the United States in April, 1929, issued its mimeographed bulletin giving statistics with regard to the progress of zoning in the United States up to the end of 1928. The complete list of zoned municipalities, with additions so far as reported to the Division of Building and Housing up to the end of April, 1929, is published on page 167 of this issue.

Private Restrictions.—The Institute for Research in Land Economics and Public Utilities, 337 East Chicago Avenue, Chicago, has published a valuable monograph by Helen C. Muncher entitled "The Use of Deed Restrictions in Subdivision Development."

Reports of Boards of Appeals.—The city of New Bedford has published the Annual Report of its Board of Appeals, dated January 1, 1929.

Boston has issued the fifth annual report of its Board of Zoning Adjustment, covering the doings of the Board for 1928. Additional items will be found on page 44 of the Annual Report for 1928 of the Boston Building Department.

Recreation.—The Denver Planning Commission has published, under date of March, 1929, a Preliminary Report on a Major Recreation Facilities Plan.

* Acts 1929, ch. 713.

State Health Department Warns Against These

THERE is no water on the premises. What little is used is carried in pails from a supply across the street which analysis shows unfit for human consumption. Waste water is poured into a funnel behind the gasoline hose and runs off in an open ditch. The privy is open to flies and overflows on the surface of the ground.

Places that look no better may be sanitary, but this one is presented by the State Department of Health of New Jersey as typical of the many roadside shacks in that state alone which go unsupervised because of the inadequacy of the official inspection staff to cover them.

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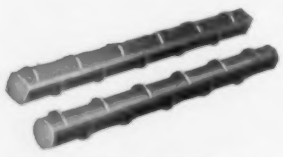

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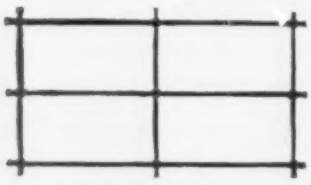

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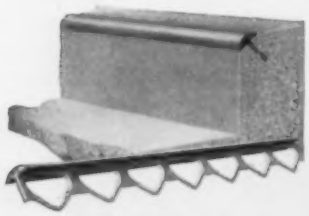

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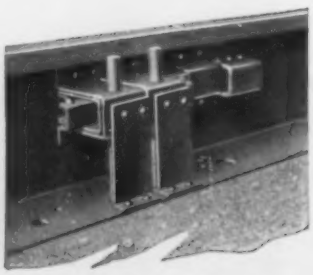

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Truscon Contraction Joints provide a definite plane for expansion and contraction

THE MONTH IN PUBLIC HEALTH

Conducted by JAMES A. TOBEY, Dr. P. H.

Civic Clubs and Health

ORGANIZED for the promotion of civic enterprise, local civic groups, including chambers of commerce, luncheon clubs, parent-teacher associations, and women's clubs, ought to be concerned with public health, because the protection and promotion of public health is one of the most important of all civic enterprises.

How to use civic clubs effectively in promoting health programs is outlined by Dr. E. L. Bishop, State Commissioner of Health of Tennessee, in the *American Journal of Public Health* for April, 1929. Dr. Bishop urges that the first step be an appraisal by the local health officer of the health machinery, organization, and methods in his community. With this accomplished, the health executive is then in a position to make his plea for cooperation on the part of the civic clubs. The analysis of community health may, incidentally, be made by using the Appraisal Form of the American Public Health Association, of New York.

"Since securing the necessary machinery for solution of health problems involves the question of financial support," writes Dr. Bishop, "a sound appeal can be made to business organizations," and he points out that industry today inquires into health conditions of areas in which it seeks expansion. In addition to the economic aspects of public health, which may appeal particularly to chambers of commerce and luncheon clubs, child health and school health matters are of special interest to parent-teacher and women's-club groups. "Throughout each presentation," continues Dr. Bishop, "he [the health officer] must make the point that the campaign for good health is not an isolated engagement, but a continuous warfare."

As a result of efforts of the State Conference of Chambers of Commerce and Civic Clubs of Tennessee in securing expansion of the state and local health departments, the appropriation for that State Health Department has been increased from 3.3 cents per capita in the biennium 1923-25 to 10.27 cents for the biennium 1927-29. The way in which this notable gain was achieved, including the assembling of accurate data about public health practice in the state and the presentation of this information to organizations throughout the state, is outlined by Dr. Bishop in his article.

From this experience it is clear that civic clubs may be effectively used in promoting health programs, by aiding in securing greater appropriations and in increasing the efficiency and extent of activity of existing local health departments. The Chamber of Commerce of the United States, with headquarters at Washington, D. C., is actively interested in public health work and is cooperating with the American Public Health Association in formulating programs for local chambers of commerce. All such programs should, of course, be carefully correlated with those of local health departments.

*Tourist and Summer Camp Sanitation**

JUNE is the month when automobile touring increases and the problem of tourist camp sanitation becomes more acute in the northern sections of the country. Most of the states now have regulations for the control of these camps, and sanitary engineers and inspectors are assigned to enforce them.

Four essential features of tourist camp sanitation are: (1) the proper location of the camp, with suitable drainage conditions; (2) an adequate supply of pure water; (3) the right facilities for the disposal of wastes, including sewage, garbage, and domestic wastes; and (4) thorough supervision, preferably by a resident manager. This information is given in an article by Mr. Edward T. Ross of the California Department of Public Health, which appears in the *Weekly Bulletin* of that state department for April 20, 1929. As Mr. Ross points out, the owners of all well-equipped and well-managed tourist camps always welcome reasonable state supervision.

Summer camps for children, which are popular during the summer months, also offer many sanitary problems. The value of these camps is set forth in an anonymous article in the *Public Health Nurse* for April, 1929, which likewise gives a bibliography of useful material on this subject. In New York, for example, the leading voluntary health agency, the State Charities Aid Association, distributes a comprehensive *Children's Health Camp Manual*.

Unless summer camps are properly managed, with due regard to sanitation and hygiene, they may prove a menace rather than a blessing. In an article in the *Monthly Bulletin* of the Boston Health Department for March, 1929, attention is drawn to the fact that on several occasions diseases have been contracted in such camps and then brought back to the city. In this article the suggestion is made that parents who wish to judge of the adequacy of health precautions in a children's camp would do well to compare it with one of the citizen's military training camps administered every summer by the United States Army.

In addition to the necessary sanitary arrangements for pure water, waste disposal, and the control of communicable diseases, nutrition is an important item in a children's summer camp. An adequate and well-balanced diet, with plenty of the so-called protective foods, pure milk, fruit, and green vegetables, must be provided. While fresh foods are always desirable, there is no objection to canned ones, and in some instances, as where the local milk supply is questionable, or no green vegetables are readily available, they may be distinctly advantageous. The advice sometimes encountered, "Don't live out of a can" is often poor advice, as modern canning methods usually do not have deleterious effects on the nutritive qualities of foods.

*On this subject see also article by Dr. Elmer W. Campbell, pages 91 to 93 of this issue.

The Cost of Diphtheria

DIPHTHERIA costs New York City over $5,000,000 annually, according to Dr. Shirley W. Wynne, Health Commissioner of New York, whose statement, given in a news release from the Department, is based on the calculations of the value of the lives lost, the cost of hospital care, and the expense of caring for patients in their homes.

Last year the loss occasioned by diphtheria in New York City was as follows:

Value of 642 human lives lost	$4,575,000
Cost of hospital care for 2,976 cases in the Contagious Disease Hospitals	391,000
Cost of caring for 7,800 cases in private homes	273,000
	$5,139,000

As against an annual economic loss of over $5,000,000 a year it is stated that an expenditure of less than 10 per cent of this sum will suffice to wipe out diphtheria and thus save the community $4,500,000 annually.

Figures by the New York City Department of Health show that thus far this year over 25,000 children have been immunized against diphtheria, nearly 12,000 having been protected by private physicians. The growing interest on the part of parents is well shown in the steady increase in the number of children immunized, which increased from 555 in the first week of the present campaign to 4,702 during the first week in April, or almost ninefold.

Sweets for Children

A BRILLIANT exposition of the nutritional principles governing the use of sweets by children appears in the *Child Health Bulletin* of the American Child Health Association for May, 1929. This article was contributed by Professor Henry C. Sherman, one of our foremost food authorities, and may be obtained as a reprint from the Association headquarters, 370 Seventh Avenue, New York.

"The practical lesson to be learned from the newer knowledge of nutrition," writes Professor Sherman in summing up,

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THROUGH a quicker acceptance of your paving job you get your money without delay when you use the "Hunt Process." No cumbersome removal of dirt or straw at the end of the cure—just roll away the "Keep Off" sign and let them on! And at the same time your concrete will be actually stronger—offer greater resistance to abrasion.

By preventing evaporation of the original mixing water the "Hunt Process" effects a complete crystallization and a perfect cure results. This is done by spraying the fresh concrete a few yards behind the mixer with a special asphaltic preparation which completely seals the pores. As the cure progresses this coating becomes an integral part of the mass.

So great are the advantages of this improved curing method that it has swept to national recognition almost over night! The first application was made only three years ago. Yet today, enough concrete has been cured by the "Hunt Process" to make a standard 20-foot pavement 500 miles long. An inquiry on your letterhead will bring you a copy of our illustrated booklet, "Curing Concrete Without the Use of Dirt and Water by the Hunt Process."

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"is the great importance to health (at all ages and especially in childhood) of giving a more prominent place, in our eating habits and in our food budgets, to what McCollum has called 'the protective foods,' i.e., to milk, fruit, and some of the vegetables; and that a 'more tolerant' attitude towards sweets for children is not justified except in so far as the use of sugar and other sweets may be practically helpful in preserving the protective foods or facilitating their attractive preparation so that children may be induced to live more largely upon them."

As a preservative and flavor, sugar may, in general, be obtained by children from moderate amounts of jam and by liberal amounts of ice cream, but its use in concentrated form in candy and in the indiscriminate and excessive sweetening of all kinds of food is not desirable, according to Professor Sherman.

Sweets or Smokes

SWEETS for children and sweets for adults are different matters and there are, generally speaking, no good reasons against a moderate amount of sweets for mature persons, provided the remainder of the diet is well balanced. Certain tobacco advertisements in which the public is advised to use cigarettes in place of sweets, or in which smoking by adolescents is stimulated, are not only vicious from the standpoint of advertising ethics, but scientifically unsound. Many comments on the warfare between the cigarette manufacturers and the purveyors of sweets have appeared recently in medical magazines. Some of these have been rather jocular in tone, as the brawl between these business interests seems to excite some derision on the part of the followers of Aesculapius.

Whether tobacco smoking is harmful or not is a subject which has aroused considerable controversy in medical circles. Excessive smoking undeniably may cause gastro-intestinal, eye, and even heart troubles in certain individuals, but, on the other hand, moderate indulgence in the pleasing weed probably is not harmful to the average adult. Smoking is not desirable for children or adolescents. The claims made by some cigarette manufacturers that their products are beneficial to throats or to nerves are, to put it tersely, bunk, regardless of the eminence of the laymen who grant testimonials, for a consideration, to that effect, or who undergo the inane blindfold tests.

"SMOKIN', EH? YOU'RE A FINE ATHLETE"
"BUT COACH, IT'S THE BRAND THE ADVERTISEMENTS SAY YOU RECOMMEND"

"CIGARET TAX WILL HELP OUT POORER MICHIGAN SCHOOLS"-
DISTRICT SCHOOL
OLD STRIKES WIN 7TH GRADE BLINDFOLD TESTS
FATAMELS WHAT A WHALE OF A DIFFERENCE A FEW CENTS WILL MAKE IN THE NEW SCHOOLHOUSE
CHESTERTIMAS THEY SATISFY THE SCHOOL BOARD
REACH FOR A LUCKY GOLD AND YOU WONT HAVE TO WALK A MILE TO SCHOOL
Hess & Johnstone

Cartoons by courtesy of New York World

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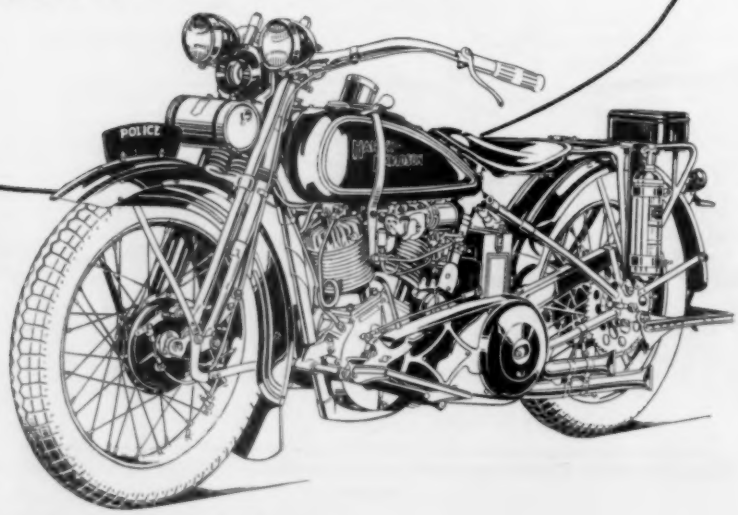

Special Police Big Twin

Note the Fire Extinguisher and First Aid equipment, which makes this great motorcycle still more valuable in police service.

Mention THE AMERICAN CITY—it helps.

THE CITY'S LEGAL RIGHTS AND DUTIES

Conducted by A. L. H. STREET, *Attorney at Law*

Ordinance Regulating Construction of Overhanging Signs Upheld.—An ordinance in Minneapolis provides: "No sign, projecting over public property, shall be so hung that the lowest point thereof will be less than 10 feet above the level of the sidewalk, except such signs as do not exceed 4 square feet in area and do not project over public property more than 18 inches, which signs shall be hung not less at any point, than 7½ feet above the level of the sidewalk, and excepting, also, signs projecting over public driveways, which shall not be hung less than 14 feet above the level of any such driveway."

Sustaining the validity of this provision in the case of State vs. Wong Hing, 222 N. W. 639, the Minnesota Supreme Court said, in part:

"One purpose of the section is to safeguard public travel on streets and sidewalks. It is a police regulation for that purpose. Its operation is localized by confining it to public property where there are sidewalks or public ways over which the sign extends. So far as this section of the ordinance is concerned, it has no application to signs erected wholly on private property, but only to such as project into or over public ways. That is a sufficient limitation. It cannot be held unreasonable to require such signs to be not less than ten feet above the level of the sidewalk. Nor is the section unreasonable or invalid because it may apply to signs located in residential or outlying districts of the city. A sign projecting over a sidewalk or public way in an outlying district carries with it the same hazard and inconvenience to travel as if in a congested business section, although, because travel may there be much less, the chances of mishaps are less frequent."

License Tax Ordinance Discriminating Against Non-Residents Held to Be Unconstitutional.—An ordinance of a Florida city purported to impose an annual license tax of $5 against local bakers, $150 against non-resident bakers making retail deliveries in the city, $100 against non-resident bakers making wholesale deliveries, and $100 against agents for non-resident bakeries. In granting an injunction against enforcement of this measure, the United States District Court for the Southern District of Florida said in the case of Ward Baking Co. vs. City of Feradina, 29 Fed. 2d, 789:

"The ordinance plainly discriminates between non-residents and residents engaged in the same occupation. The classification upon which the difference in tax is based is not according to occupation, but according to residence. Upon well-settled principles the ordinance is void as violating article 4, sec. 2, of the Federal Constitution, which guarantees to citizens of each state the privileges and immunities of citizens in the several states, and in that it violates the provisions of the Fourteenth Amendment to the Federal Constitution, which prohibits any state from making or enforcing any law which abridges the privileges or immunities of citizens of the United States, and which prohibits the states from depriving any person of liberty or property without due process of law, and from denying any person the equal protection of the laws. Campbell Baking Co. v. City of Harrisonville (D. C. Mo.) 19 Fed. 2d, 159. . . .

"While the corporation complainant cannot claim the protection of those constitutional provisions which are designed to secure the privileges and immunities of citizens of the United States, yet the individual complainant, Harrod, is entitled to the protection of those provisions, and both the individual complainant and the corporation complainant are entitled to invoke the provisions of the Fourteenth Amendment, forbidding deprivation of property without due process, and which prohibits any state from denying any person within its jurisdiction the equal protection of the laws. Campbell Baking Co. v. City of Harrisonville (D. C.) 19 Fed. 2d, 159."

Indexes to Legal Decisions

The items appearing in this Department each month are classified by subjects in THE MUNICIPAL INDEX. The 1928 edition of the Index, on pages 110 to 115, covers the legal items published during 1924 to 1927 inclusive, while pages 94 to 97 of the 1929 Index list the items for last year.

Cities Held Empowered to Pave Streets Forming Part of State Highways.—"The fact that the state highway commission adopted a city street as a part of a state highway, and has power to improve and maintain it as part of the highway, does not prevent the city from paving such street at the expense of the property owners and of the city treasury, as the taking-over of the highway by the highway commission does not completely divest the city of control of the street, nor relieve it of the duty of keeping it in reasonably safe condition for travel." (Moore vs. Board, etc., of Town of Duck Hill, 119 So. 324, decided by the Mississippi Supreme Court.)

Statute Requiring Award of Public Contracts to Lowest Bidder Is Inapplicable to Employment of Supervising Engineers.—What the Texas Commission of Appeals decided in the case of Gulf Bitulithic Company vs. Nueces County, 11 S. W. 2d, 305, concerning the validity of a contract by a county, employing one to supervise road construction, would apply with full force to contracts by cities and other municipalities for engineering services. It was decided that the contract involved was not invalid because not let under competitive bidding. Concerning a statute requiring contracts for public work to be let under competition, the Commission said in an opinion approved by the Texas Supreme Court:

"The clear purpose of the enactment of this statute was to enable counties to obtain the performance of any public work at the lowest possible cost to the taxpayer. If it be so construed as to bring contracts of the nature involved in this case within its provisions, the very object of the statute would be defeated, for the obvious reason that, when a county does a given piece of construction work, paying for the material and labor, the ultimate cost thereof is necessarily largely dependent upon the skill, experience, and business judgment exercised in the management and supervision of such work.

"Where a county does the building of its public roads by contract, it is not particularly interested in whether the contractor constructs such road in an economical manner. If he fails to do so, and a loss results, the same does not fall upon the county, as it can only be required to pay the price stipulated in the contract, and such loss must be borne by the contractor. Where, however, the county has the work performed under its own supervision, paying cost of the labor and material, it is vitally interested in such work being done in the most economical manner possible, as it must bear the entire cost thereof, whatever it may be. To hold that contracts for the supervision of work done directly by the county must be let to the lowest bidder would result in the county obtaining the least competent supervision, as those possessing the necessary skill, experience, and business judgment to supervise a large construction program in the most efficient and economical manner could not hope to successfully compete with those of lesser skill, experience, or business judgment."

The illustration at the left shows a General Electric Novalux Suspension Unit equipped with Holophane B-SYM-ETRIC Rippled Bowl Refractor. This refractor directs light downward and spreads it up and down the street to provide approximately uniform illumination.

PLANNED LIGHTING

Safely speeding traffic—convenience to motorist and pedestrian—a bright, cheerful and beautiful street—these come with good street lighting.

But good street lighting must be planned street lighting. Unless carefully planned the result will be unsatisfactory, the cost will be unnecessarily high.

Planned street lighting uses Holophane refractors—the light-directors produced by Holophane for outdoor service. They control the light of the Mazda lamp, convert it into illumination and enhance visibility. Their cost is extremely low in comparison with the results which they give. Maintenance is simple and inexpensive because they are sturdy, easily cleaned units, built specifically for outdoor service.

For further particulars, for data on specific installations, for lighting recommendations for streets, parks, bridges, highways, etc., get in touch with the street lighting engineers of the General Electric Company, the Westinghouse Company, the Line Material Company—or Holophane Company, Inc., 342 Madison Avenue, New York.

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City Council May Exercise Reasonable Discretion in Relocating and Extending Streets.—A Toledo property owner sought to enjoin the city from proceeding to the relocation and extension of a street. But the Ohio Court of Appeals for Lucas County dismissed the suit, saying (Koch vs. City of Toledo, 164 N. E. 124):

"The council had a right to consider all conditions and all elements in determining whether or not it would proceed with the improvement. It could consider not only the needs of traffic, and its hazards, but also the industrial growth and development and welfare of the city. There was room for great difference of opinion as to what was the best course to pursue. We cannot say that there was an abuse of discretion on the part of the council. The powers of this court are judicial. Those of the council are legislative. The discretion to determine what property shall be appropriated for street purposes is vested in the council of this city under the Constitution and laws of Ohio and the charter of the city of Toledo; and this court, in the exercise of its judicial power, has no right to interfere with the legislative action of the council in the instant case, and to do so would be to usurp the functions of the legislative branch of the municipality."

Policeman's Right to Commandeer Automobile and Driver for Pursuit Purposes Upheld.—An opinion handed down by the New York Court of Appeals, December 31, 1928, in the case of Babington vs. Yellow Taxi Corporation, has a strong bearing on the much mooted question concerning the right of police officers to commandeer private automobiles and their drivers for the pursuit of escaping persons.

A New York policeman sprang upon the running board of a taxicab and ordered the chauffeur to pursue a car ahead. In the course of the chase, the taxicab collided with a street car and the chauffeur was fatally injured.

The ultimate question decided by the Court of Appeals was whether or not any one of the decedent's three surviving widows was entitled to an award under the New York Workmen's Compensation Act, on a theory that the fatal injury occurred in the course of his employment by the taxicab corporation. The company's insurance carrier insisted that the instant the chase started the chauffeur ceased to be in the employ of the corporation. The Court of Appeals ruled against that contention, saying, in part, through Judge Cardozo, who traced back to ancient days the duty of all persons to aid in making arrests:

"The horse has yielded to the motor car as an instrument of pursuit and flight. The ancient ordinance abides as an interpreter of present duty. Still, as in the days of Edward I, the citizenry may be called upon to enforce the justice of the State, not faintly and with lagging steps, but honestly and bravely and with whatever implements and facilities are convenient and at hand. The incorporeal being, the Yellow Taxi Corporation, would have been bound to respond in that spirit to the summons of the officer if it had been sitting in the driver's seat. In sending Babington upon the highway, it knew or is chargeable with knowledge that man and car alike would have to answer to the call. An officer may not pause to parley about the ownership of a vehicle in the possession of another when there is need of hot pursuit. In so far as the danger of pursuit was a danger incidental to the management of the car, it was one of the risks of the employment, an incident of the service, foreseeable, if not foreseen, and so covered by the statute."

One member of the Court of Appeals—Mr. Justice Kellogg—dissented from the decision, taking the view that the moment the chauffeur commenced the chase he ceased to be an employee of the taxicab company, for the time being, and became that of the police department.

A Property Owner Held Entitled to Compensation for Partial Street Closing—Measure of Damages.—Where closing of a street across a railroad right-of-way in a city destroyed the access of an abutting property owner to one of the main streets of travel, he was entitled to an award of resulting damages, held the Mississippi Supreme Court in the case of City of Jackson vs. Wright, 119 So. 315.

The Court further decided that, in order to cut off a property owner's claim for damages to property abutting on a street which is closed, on the ground that there is an intervening street or passageway between the property in question and the closed part of the street, there must be a worked street, kept in reasonably safe and efficient condition for travel, by which he can conveniently reach other improved streets,. The mere laying-out on a map of a street which is not open and worked for public travel is not sufficient to bar the abutter's right to an award.

As to the measure of damages in such cases, the official syllabus of the case announces the following stated rule, which is in line with the rule usually applied by the courts to the assessment of damages generally:

"In assessing damages to an abutting property owner because of the closing of a street, the test for determining damages is for the jury, on the trial of such facts, to consider each purpose or use for which the property is suitable and adapted; it is not measured by the intention existing in the mind of the owner as to what use it will be put, nor is it limited by the use to which it has actually been put. All of the uses to which it may logically be put, and which it is calculated by its nature and situation to serve, may be considered, and the difference in value immediately before the closing of the street, and immediately thereafter, considered in connection with the things above stated, is the measure of damages."

Right of Free Speech Does Not Justify Obstruction of Public Ways.—A sidewalk and a street were obstructed by a street meeting in Lynn, Mass., while defendant was speaking on the right of the people to use the streets for such meetings. He was convicted of obstructing the way and took the case to the Massachusetts Supreme Judicial Court for review. Affirming the conviction, that Court held in the case of Commonwealth vs. Surridge, 164 N. E. 480, that the constitutional right of free speech does not permit such obstructions to public travel. Said the Court:

"By the location of a highway an easement of passage is secured for the public with all incidental privileges thereby implied. The fee of the land commonly remains in the owner, who may make any use of it not inconsistent with the paramount right of the public. The easement of passage for the public acquired by the layout of a highway includes reasonable means of transportation for persons and commodities and of transmission of intelligence. Whatever interferes with the exercise of this easement is a nuisance, even though no inconvenience or delay to public travel actually takes place.

. . .

"It is manifest that making a speech from a box and thereby gathering a standing crowd of people, all taking place within a highway, is not an exercise of the easement of travel. It is equally manifest that such speech-making and standing crowd is an obstruction to the right of the public to use the highway for travel. It is quite different from the use of the highway for a procession or parade, or for seeing distinguished public personages, or other of the common uses of a highway whereby crowds of people are caused to collect. Occasions may arise where it may be difficult to draw the line. But the case at bar is not close to the line. It presents a plain instance of obstruction of a public way not authorized by any general law."

It Is Misfeasance to Delegate Performance of Official Discretionary Duty.—What the Tennessee Supreme Court decided in the case of State vs. Ten Citizens of Campbell County, 11 S. W. 2d, 897—that the chairman of a county board of education was subject to ouster for delegating to the clerk of the board approval of warrants—would seem to apply with equal force to all municipal officers upon whom the law devolves the personal discharge of discretionary powers. The Court said:

"This action of the chairman of the county board in procuring a rubber stamp bearing a facsimile of his signature and authorizing the clerk of the board to affix this stamp to county warrants seems to us a conscious and willful neglect of an important duty enjoined by the section just above quoted. As a check upon a reckless or dishonest county superintendent in the issuance of warrants, the statute required the counter-signature of the chairman of the board of education. The chairman was expected to approve and authenticate each one and thus protect the schools. Such a duty cannot be delegated to a mere clerk. For a trusted fiscal officer to knowingly and willfully shirk such a duty constitutes abundant ground for his removal from office."

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MUNICIPAL AND CIVIC PUBLICATIONS

Orders for books reviewed in this department will be filled promptly by THE AMERICAN CITY. Pamphlets, reports and all other publications should be ordered direct from addresses given. Prices do not include postage unless so stated.

Reading in Public Opinion: Its Formation and Control. Edited by W. Brooke Graves, Professor of Political Science, Temple University. Introduction by Clyde L. King, Professor of Political Science, University of Pennsylvania. D. Appleton & Co., New York. 1928. 1,290 pages. $6.

This book is made up of over 200 selections from the writings of famous contemporaries chosen and presented by Professor Graves in a way to give a unified exposition of the manner and methods by which public opinion is formed. What are the agencies for its formation and control? How do they operate? And how are they manipulated?

How does the crowd mind function? What is the power of religious appeal? The weight of newspaper influence? The part the theater and books play in determining public opinion? These are some of the questions which will be found answered in a work which looks toward "the day when we will be able accurately to measure public opinion." This work falls into four parts: "Introductory"; "The Influence of Established Social Institutions"; "The Influence of Private Organizations"; and "Government and Public Opinion." The six chapters of the introductory section are devoted to "The Formation of Personal Opinion," "The Role of Discussion in the Formation of Public Opinion," "The Nature of Group Opinion and of Public Opinion," "Essential Conditions and Possible Scope of Public Opinion." "Hereditary and Environmental Influences Upon Opinion," and "Public Opinion in the Community," with such representative names as those of A. Lawrence Lowell, Walter Lippmann, Graham Wallas, John B. Watson, and Sigmund Freud among the many contributors to the section.

Each chapter keeps uppermost the question: what is the manner, and what are the methods by which this institution, or this organization, or this type of personality secures a desired reaction in the public mind? In some of the chapters devoted to "Government and Public Opinion," the additional question is developed: What do people think about foreign affairs, or about war, or about the administration of justice? And in each case, why? This has been done, the editor explains, to give another type of approach to the problem. Similarly one might ask, What do people think about public health, and sanitation, about education, about the problems connected with a state highway system? And again in each case, why?

The book is designed primarily for students, undergraduates and others. Since it has been prepared by one whose chief interest is stated to be a political interest, it will be read with profit by those interested in the evolution of good government. And in view of the present widespread vogue for "adult education," it is a book that deserves to become a best seller.

Community Hygiene.—By Dean Franklin Smiley, A.B., M.D., and Adrian Gordon Gould, Ph.B., M.D. New York. The Macmillan Company. 1929. 350 pp. $2.00.

Students in many colleges are now required to take courses in hygiene. This book, written by two professors of hygiene at Cornell University, has been designed as a college textbook on hygiene and sanitation, and as such it gives in concise form the essential facts regarding community health. It is not intended as a manual for city officials and would be inadequate for that purpose. The 25 chapters take up briefly the history of public health; environmental health hazards and their control, including man, animals, insects, and their surroundings as sources of infection; the community attack on certain specific diseases; the health problems of certain groups, such as mothers and children, industrial workers, etc.; and the agencies in the public health field.

JAMES A. TOBEY.

Aircraft Year Book, 1929.—Published by the Aeronautical Chamber of Commerce of America, Inc., New York. 484 pp. $5.25.

The eleventh successive Aircraft Year Book, covering the aviation activities of 1928, is a fascinating and attractive volume embracing a wealth of factual material. Its broad scope is indicated by the following chapter headings: Aviation Qualifies as a Major Industry; The Trend in Air Transport; Air Transport Operations; Aerial Service; Private Flying; Manufacturers; Airports and Airways; Education; Government Civil Aviation; Military and Naval Aviation; Airship Development; Chronology (presenting the outstanding historical events of the year in aviation); World Aviation in 1928; Technical Development; Aircraft Engine and Design Section; Appendix; and Trade Index.

Thus one can review in an orderly manner the remarkable progress which man has made in his conquest of the air during just one year. To the layman, the generous supply of illustrations probably is the most intriguing feature of this log of achievement. Exceptionally clear photographs of the principal types of aircraft now manufactured in the United States liven up this guide book. The first paragraph of Chapter I sets the stage for the drama which follows:

"The year 1928 witnessed an amazing transformation of aeronautics in the United States. Flying became a recognized public service. The end of the year—the 25th anniversary of human flight—found it well to the fore among other means of transportation. American aviation, including not only flying but also the manufacture of equipment and the development of airports and airways, was beginning to assume the proportion of a major industry."

Constructing a Dustless Landing Strip for Air Terminal at Los Angeles.—The Grand Central Air Terminal recently opened at Glendale, Calif., a suburb of Los Angeles, is equipped with concrete runways, has hangars of fireproof construction, and when proposed extensions are completed will qualify for an A 1 A Department of Commerce rating. A 3-page article in the *Engineering News-Record* for April 25, 1929, contains an illustrated description of construction work on this project. 25c. (Apply to McGraw-Hill Publishing Co., New York.)

When Disaster Strikes.—Procedure for Red Cross Chapters. Revised Edition. A 36-page handbook containing descriptions of complete disaster organization and procedure, descriptions and illustrations of record forms and reports, and tabulations showing in chronological order action to be taken under direction of the Chapter Chairman when disaster strikes. (Apply to American National Red Cross, Washington, D. C.)

The Building Code.—A symposium. The six contributions are "Building Code Legislation: Its Benefits and Dangers," by Arthur Tappan North, Member, American Institute of Architects, New York; "The Building Code: Its Purpose, Elements, and Preparation," by Rudolph P. Miller, Member U. S. Department of Commerce Building Code Committee; "The Building Code, A Function of Social and Economic Welfare," by Frank Burton, past President, Detroit Engineering Society; "The Building Code, an Essential Law and Its Making," by Fermor Spencer Cannon, Member, A. I. A., Indianapolis, Ind.; "The Building Code," an editorial from *The American Architect;* and "Recommended Practice for Arrangement of Building Codes," a report of the Building Code Committee, U. S. Department of Commerce, 1925. 30 pp. (Apply to American Institute of Steel Construction, 200 Madison Avenue, New York.)

American Road Builders' Association: 1929 Convention Proceedings.—The 26th Annual Convention and Road Show of this organization was held in Cleveland in January, 1929. The proceedings are now published in a substantial, well-printed volume of 582 pages, edited by Charles M. Upham, Secretary-Director of the Association. Papers and reports of the various sessions—general, engineers, constructors, Pan-American, city officials, county highway officials, manufacturers, and the banquet—are included, covering various phases sch as design, construction, maintenance, equipment, finance, regional planning, etc. At the Pan-American session, where 29 countries, in the Americas and elsewhere, were represented, the highway work in various important Latin-American countries, and Canada, was described. There are many illustrations. $5.00 from the Association, National Press Bldg., Washington, D. C. A reprint of three of the papers—"Subgrades and Pavement Basis," "Highway Finance," and "Practical Application of Recent Highway Investigations"—is also available.

Highway Construction, Administration and Finance.—A 120-page booklet by E. W. James, Chief, Division of Design, United States Bureau of Public Roads, containing a series of articles first published in Spanish in *Ingenieria Internacional*, and reprinted by the Highway Education Board. There are chapters on planning and financing a national highway system, and others on various types of road construction, etc. Many photographs and other illustrations. 50c. (Apply to Highway Education Board, Architects Bldg., Washington, D. C.)

Typical City Plan to Better Traffic Conditions.—This is the prize-winning plan in the competition sponsored by *Nation's Traffic*, and is by Gardner S. Rogers, Assistant Manager, Civic Development Department, Chamber of Commerce of the United States. It is set forth on five pages in *Nation's Traffic*, for April, with the aid of various drawings. It deals with a hypothetical city of 500,000 population, and consists of a very comprehensive study and plan in concise form. 25c per copy. (Apply to *Nation's Traffic*, Oklahoma City, Okla.)

Detroit Police Department: 1928 Report.—This 28-page booklet is based upon the standards for annual reports suggested by the Committee on Uniform Crime Records of the International Association of Chiefs of Police. Certain adjustments were necessary, but it is expected that the 1929 report will be in even closer conformity with these recommendations. (Apply to W. P. Rutledge, Commissioner, Police Department, Detroit, Mich.)

The Construction Log.—A publication devoted to the interests of the City Engineering Department of Flint, Mich., containing the annual report of the Engineering Department for the fiscal year ending February 28, 1929, and the first annual report of the Sewage Treatment Works, for the year 1928. 34 pages. (Apply to the Department.)

Dams and Control Works.—A description of representative storage and diversion dams and high pressure reservoir outlet works constructed by the Bureau of Reclamation, United States Department of the Interior. Twenty of the 125 dams constructed by the Bureau since its organization in 1902 are described in articles either reprinted or published for the first time. There are also a few more general articles, copies of specifications and a table of data on the dams that the Bureau has built. 164 pages. (Apply to Elwood Mead, Commissioner, Bureau of Reclamation, Washington, D. C.)

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A Guide to Material on Crime and Criminal Justice.—Augustus Frederick Kuhlman. University of Missouri. The H. W. Wilson Company. 1929. 633 pp., buckram. $12. (Specially priced on service basis.)

This is a descriptive, classified and annotated union catalog of books, monographs, pamphlets, and periodical articles prepared by the author for the Committee on Survey of Research on Crime and Criminal Justice of the Social Science Research Council. It covers Criminology; the Administration of Criminal Justice; Criminal Law; Police; Judicial Organization; Criminal Procedure; Punishment; Institutional Treatment of Offenders in Prisons, Jails and Reformatories; Pardons; Paroles; Probation; the Juvenile Court; and Crime Prevention: every phase, in fact, of crime and criminal justice in the United States. It is based upon material available in thirteen selected libraries and articles listed in the leading periodical indexes. The classification is designed to describe this material in its functional relationships.

The object of the preparation and publication of the material in catalog form is described by the author as being two-fold: first, to index, describe, and classify as completely as possible in one volume, existing material; second, to show by means of the Union List library symbols, libraries in which research students may gain access to this material.

"The purpose of the Social Science Research Council in launching the survey," says the author, was "to take stock of all research work on Crime and Criminal Justice in the United States in order to provide a basis of fact upon which its Advisory Committee on Crime would be able intelligently to consider and formulate proposed research projects that are submitted for approval." A second volume which will supplement Professor Kuhlman's, and with it will constitute the complete report of the Committee on a Preliminary Survey of Research to the Social Science Research Council, is now in preparation. Professor Raymond Moley is its author and it will concern itself primarily with a critical evaluation of research work done, or now in progress.

National Committee on Prisons and Prison Labor.—A high note of optimism is struck in the 1928 annual report of this Committee, which records the passage of the Hawes-Cooper Law, in the interest of which it has worked for 20 years. The law will make prison contract labor unprofitable to those who have capitalized it, and thus "the end is in sight of the hundred-years' struggle against the exploitation of the prisoner." The report presents in its 32 pages the high lights of the tasks still confronting those working in the interest of thorough-going prison reform. (Apply to 4 West 57th Street, New York.)

Blue Book for Recorders and Mayor Magistrates.—A "working book of ready reference relative to jurisdiction, procedure, proper forms, proper dockets, etc." prepared especially for use by officials in smaller municipalities in New Jersey. Recorders' Courts are rapidly increasing in number in that state, where they have proved popular as a medium for administration of local justice, and where they have brought a greater amount of home rule. Every borough and township in that state may have the advantages of a Recorders' Court under a law which now provides that two or more municipalities may unite in the provision of one. Much depends upon the standard of the court and its manner of operation, according to the publishers of the present work, who bring together a large body of information in the 94 pages. A chapter on Procedures lists, under a group of general headings, the forms to be officially used in the carrying out of such procedures. $1.50. (Apply to Usher Publishing Company, 108 North Broad Street, Trenton, N. J.)

The Cincinnati Woman's City Club.—The May and June issues of *The Bulletin*, publication of the Cincinnati Woman's City Club, are Year Book numbers, containing annual reports of all committees and their activities. Experts in governmental affairs who see the imperative need for "permanent, civically-minded, non-partisan" bodies concerning themselves actively with matters of public importance will find comfort in the number and kind of civic activities reported upon. 10c. (Apply to the Club, 528 East Fourth Street, Cincinnati, O.)

Civil Airports and Airways.—By Archibald Black, Air Transport Engineer, with the collaboration of a group of 19 specialists in the different branches of airport construction and equipment. Simmons-Boardman Publishing Co., New York. 1929. 238 pp. $4.00.

Municipal and commercial aviation officials concerned directly with the problem of proper airport construction will find Mr. Black's clearly written and attractively illustrated book both interesting and valuable. In a simple yet comprehensive manner, he traces step by step the methods of providing a municipal or commercial airport. While some of the requirements he stresses may impress his more air-minded readers as rather elementary at this advanced stage of airport development, they nevertheless are fundamental and vital to the proper understanding of the airport problem as a whole. The author has prudently selected only the most important material available to date on airport construction and intelligently classified it in what actually is a guide book of especial utility to those city officials who control the selection of airport engineers and the expenditure of municipal airport funds.

The following chapter headings indicate the extensive treatment which Mr. Black and his collaborators have accorded the subject: Putting the City on the Airline, Selection of Airport Sites, Planning the Field Layout, Clearance and Construction of Flying Fields, Drainage of Flying Fields, Airport Roads and Runways, Buildings for Airports, Airport Maintenance and Operating Equipment, Repair Shop Equipment for Airports, Fire Protection for Airports, Special Requirements of Seaplane Bases, Requirements of Airship and Balloon Stations, Airways Lighting Equipment, Radio Equipment for Airways, and Airways Meteorology. An appendix contains definitions of common aviation terms, the Department of Commerce airport regulations and rules, and sample rates and charges at airports.

Die Deutschen Städte, Ihre Arbeit Von 1918-1928.—Edited by Dr. Erwin Stein, General Secretary of the Verein für Kommunalwirtschaft und Kommunalpolitik; and Dr. Fritz Elsas, Vice-President, Geschäftsführendes Vorstandsmitglied des Deutschen und Preussischen Städtetages. Duetscher Kommunal-Verlag, G. M.B.H. Berlin-Friedenau. 1928. 164 pages. 10 x 13 inches.

This handsomely illustrated, cloth-bound volume contains 52 articles by various municipal officials and experts in municipal administration, dealing with municipal administration in Germany during the past ten years. Such subjects as employment, civil service, vocational guidance, finance, public utilities, housing, recreation, education, police, traffic, and aviation are covered. About 25 of the articles are concerned with recent development of individual German cities.

A limited supply of copies has been sent to the National Municipal League, 261 Broadway, New York, for distribution to municipal officials, civic organizations, and others particularly interested. These will be sent while they last upon request and agreement to pay 50 cents to cover the parcel post charges.

The Challenge of the Power Investigation to American Educators.—A 48-page pamphlet containing an address, with some additional material, of Judson King, Director, National Popular Government League, before the convention of the American Political Science Association in December. It is published by the League in response to requests for copies of the address from many who had heard it. It refers to the investigation of the publicity methods of electric power companies conducted by the Federal Trade Commission, and emphasizes the part played in such publicity by persons connected with various educational institutions. 25c. (Apply to the League, 637 Munsey Bldg., Washington, D. C.)

The Detroit-Windsor Bridge—Part I.—A pamphlet of 26 pages prepared and issued by Charles Evans Fowler, Consulting Engineer. It contains a description of the design of the Detroit River suspension bridge now under construction between Detroit, Mich., and Windsor, Ont., with the promotion and design of which Mr. Fowler has been closely connected. There are various drawings for illustration. $1. (Apply to Mr. Fowler, 25 Church Street, New York.)

The Smoke Problem in Boston.—Boston has a smoke problem. As long ago as 1912,—a pamphlet entitled the "Final Report on the Smoke Nuisance" presented the elimination of the nuisance as "approaching completion." In 1929, it seems further away. Therefore *Our Boston* has collected an array of facts and opinions bearing upon the question, and has devoted practically its entire April issue to their presentation. The late Professor William A. Bassett, Director of the Division of Municipal and Industrial Research of the Massachusetts Institute of Technology, is author of the leading article which presents the fundamentals of the problem, and traces legislative attempts at correction. Other contributors are: Ellerton J. Brehaut, Boston Chamber of Commerce, and Mrs. Henry D. Tudor, president, Woman's Municipal League, Boston. There are also a group of technical articles by combustion engineers, and others. 10c. (Apply to the publication, 465 Main Street, Boston, Mass.)

Smoke Abatement in New York City.—Bulletin No. 32 of the Municipal Art Society of New York is a 14-page report of a survey of the entire subject of smoke abatement efforts, and of recommendations made hitherto both in New York and elsewhere. "It is the result of an attempt to assemble and summarize the data collected by the numerous agencies interested, most of which have proceeded in their investigations and efforts independently of each other and more or less sporadically . . . ; it is further the result of an attempt to digest the reports and the thought, and to weigh the past effort of expert and laymen; finally, its purpose is to set forth a concise statement of possible procedure and to recommend therefrom an informed program of action." (Apply to the Society, 191 E. 19th St., New York.)

Public Dance Halls.—Bureau Publication No. 189 of the Children's Bureau, United States Department of Labor, 1929, is devoted to public dance halls, their regulation and place in the recreation of adolescents. State laws and city ordinances on the subject are analyzed and descriptions are given of the methods developed in 15 cities in the administration of such laws and ordinances. A brief report on the character of public recreation as it affects the dance-hall problem in cities with extensive recreation programs is also given. 58 pp. 10c. (Apply to Government Printing Office, Washington, D. C.)

A Review of Current Practice in the Lighting of School Buildings in the United States.—By James E. Ives, Physicist, U. S. Public Health Service. An 8-page reprint (No. 1261) from *Public Health Reports*, December 14, 1928, of an article prepared at the request of the committee on lighting legislation of the Illuminating Engineering Society. 5c. (Apply to Government Printing Office, Washington, D. C.)

Directory of Commercial Testing and College Research Laboratories; Supplement to the Directory.—The Bureau of Standards of the Department of Commerce, Washington, has published a supplement designed to accompany Miscellaneous Publication No. 90, of the above title, under date of December 6, 1929. In accordance with law, the Bureau makes tests and carries out investigations for other government departments, but does not find it practicable to make tests for private individuals if other laboratories can do the work. It therefore brings together, in this directory and the supplement, material designed to inform interested persons of the location of other laboratories and the commodities they are willing to test. 46 pp. and 4 pp.; 15c and 5c, respectively. (Apply to Government Printing Office, Washington, D. C.)

Purchasing Methods and Procedure in Kansas City, Mo.—A 32-page multigraphed report, paper-bound, issued by the Kansas City Public Service Institute, covering an investigation on the above subject. The city's unsystematized purchasing methods are compared with standard methods in use in business and government, and suggestions for greater economy and efficiency are made. (Apply to Walter Matscheck, Director, 501 Orear-Leslie Building, Kansas City, Mo.)

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Housing Problems in America.—Proceedings of the Tenth National Conference on Housing, Philadelphia, Pa., January 28-30, 1929. Published by the National Housing Association, 105 East 22nd Street, New York. 365 pp. $3 postpaid. Free with annual $5 membership in the Association.

Much happened in housing and in the group of closely related fields between the Ninth National Housing Conference in 1923 and the 1929 Conference. Meantime, during the past year or two, interest in better housing as a governmental responsibility and as a civic responsibility has greatly increased in many parts of the country, creating a demand for more and more generally available material representing the soundest opinion and the most outstanding progress for the movement as a whole. This group of 25 papers and the appended discussions will do much to fill that demand.

Almost half of the volume is devoted to city planning and population control as related to housing, with many valuable papers, including: "The Obsolete Back Yard," by John Ihlder, Executive Director, Pittsburgh Housing Association; "A Neighborhood Scientifically Developed and Conceived," by Robert Whitten; "The Need of a Master Plan to Guide City Growth," by John Nolen; "The City of Dreadful Height," by Lawson Purdy; and "Do We Want Three-Level Streets?," by Harvey Wiley Corbett.

Other important papers include "Slum Clearance," by Lawrence Veiller; "Is Government Aid Necessary in House Financing?", by Mrs. Edith Elmer Wood; "Slum Improvement by Private Effort," by Harold S. Buttenheim; "Slum Improvement by Reconditioning," by Maxwell Hyde; and "Building and Loan Associations as Home Financing Agencies," by George L. Bliss. Among several papers bearing upon housing and health, is one by Wayne D. Heydecker; while prominent among the papers of subjects of modern home materials and home design are "The Scientific Kitchen," by Hildegarde Kneeland, and "Homes Equipped for Children," by James Ford. "What the Rest of the Country Can Learn from Philadelphia" is the title of a paper in which Bernard J. Newman gives an account of the Philadelphia Housing Association achievements.

Housing as Related to Tuberculosis—1915 to 1928: A Bibliography.—Twenty-five years ago when the anti-tuberculosis campaign in the United States and throughout the world was in its comparative infancy, the subject of housing in relation to tuberculosis was given much more emphasis than has been the case in recent years. At that time it was generally believed that a primary purpose of the campaign against tuberculosis was to fight infection of any and all kinds.

In more recent years, however, with the development of the chilhood infection theory and the general belief in the long latency of tuberculosis, the emphasis on the house as a specific factor in the spread of tuberculosis has decreased. Within the last ten years, furthermore, as the whole subject of juvenile tuberculosis has been further studied and the extreme importance of contact infection in tuberculosis has become clear, the trend in tuberculosis work has been further away from bad housing as a factor in the spread of tuberculosis.

The general feeling among tuberculosis workers today is that tuberculosis is most commonly spread by direct contact of some sort between the host and the patient. The dark rooms, dirty stairways and the other accidents of bad housing do not necessarily spread tuberculosis in and of themselves. On the other hand it is becoming more and more apparent that bad housing as a concomitant of poor living and working conditions, is unquestionably a part of that vicious circle of influences tending to break down the individual already infected with tuberculosis.

In general this statement would summarize such consensus of opinion as there is in the bibliography prepared by Sarah I. Morse. (Reprinted from *Journal of the Outdoor Life*, 370 Seventh Ave., New York, April and May, 1929. 8 pp. 25c.)

PHILIP P. JACOBS.

The Use of Chlorine in Water Purification.—A paper by George C. Bunker, formerly of New York, reprinted from the Journal of the American Medical Association, Jan. 5, 1929. 18 pages. (Apply to the author, P. O. Box 5035, Ancon, Canal Zone.)

Manual of Planning Information.—Including Manual of Information on City Planning and Zoning, by Theodora Kimball; and a Supplement, Planning Information Up to Date, by Theodora Kimball Hubbard and Katherine McNamara. Harvard University Press, 1928. 188 pp. and 103 pp. $4.50.

The Manual of Information on City Planning and Zoning, 1923, is now practically out of print, but this new volume comprises the same sheets bound up with the Supplement (a review of which appeared in THE AMERICAN CITY, December, 1928, page 173, and which is available in separate form at $2 per copy). The bringing together of the two volumes in one binding places in the reader's hands a ready reference work covering substantially the whole body of printed information on planning; and the single volume idea seems a particularly happy one, since the five-year Supplement is intended to be used in conjunction with the earlier volume, and is incomplete without it.

Regional Planning in the United States.—With a Foreword by Frederic A. Delano, President, American Civic Association; a statement and summary by Thomas Adams, Chairman, Committee on Regional Planning; and a report of the Conference of the Committee on Regional Planning of the American Civic Association, held at Buffalo, N. Y., November, 1928. Fourteen regions are summarized, covering roughly "about 35,000 square miles, or 22,400,000 acres, and including nearly 30,000,000 people, a little less than one-third of the total population of the continental United States." Activities and efforts in these regions and in a number of other partially organized regions show that here is a growing movement of national scope and great promise. 24 pp. 10c. (Apply to the Association, Union Trust Building, Washington, D. C.)

The City Plan, White Plains, N. Y.—The White Plains city plan as prepared by E. P. Goodrich and Robert Whitten, city planning consultants, and adopted by the Common Council, September, 1928, has just been published by the Bureau of the City Plan, Department of Public Works. (52 pages, 8 x 11 inches, with a series of folded inset maps.) It covers a period of 50 years, and improvements called for have been budgeted. This plan has been based upon exceptionally detailed studies of local conditions. It has been correlated where possible with the plans of the Westchester County Park and Parkway system, and has made use of the studies of the Regional Plan of New York and Its Environs where this was feasible. (Apply to the Bureau.)

Strasse, Platz und Hauptbau (Street, Plaza and Chief Building).—A booklet in German by Dr. Karl Lieser, presenting a study of the reciprocal esthetic relations of public places or squares, their tributary streets, and their dominant buildings. Twelve specific examples—eleven from Germany and one from Italy—are particularly discussed. 1929. 51 pages, plus a separately bound collection of 38 plans and other sketches. 7 marks. (Apply to Carl Winter's Universitätsbuchhandlung, Heidelberg, Germany.)

Fire Insurance Rates and Fire Losses, Kansas City, Mo.—A study intended as a fact-basis for future Chamber of Commerce activities, designed to bring about better mutual understanding between buyers and sellers of fire insurance and to bring down insurance rates. It follows a hitherto unblazed trail in seeking and presenting fire protection and fire loss facts and figures, according to the Insurance Committee of the local Chamber of Commerce for which it was undertaken by the Civic Department. Among its findings are these: that the city's rates are based primarily on the loss experience of the whole state, while in fact it maintains a much lower average loss; that the per capita losses are high in comparison with those of the 36 largest cities of the country; and that the fire loss ratio in Missouri is comparatively high, the state ranking thirteenth among the 48 states. Four ways of reducing rates are suggested: improvement of individual property by the owners; more favorable grading of the fire protection facilities of the city; use of lower basis tables for the whole state; and the upholding of a 10 per cent reduction order issued in 1922 by the State Superintendent of Insurance, and now pending in the courts. Much valuable information of general significance. 24 pp. 50c. (Apply to the Chamber.)

The Economic Effects of Public Debts.—By Shutaro Matsushita, Ph.D., Columbia University Press, New York, 1929. 186 pp. $3.00.

Distinguishing the nature and purpose of public debts from private debts, the author traces the history of public debt theory, and analyzes the economic effect of such obligations, classifying these effects as those due to their nature, their purpose, and their redemption. Emphasis is placed upon purpose, and the beneficial effects of public borrowing for useful public works and utilities. The book is No. 309 of the Columbia University Studies in History, Economics and Public Law.

On the Cost of Distribution of Electricity to Domestic Consumers.—Morris Llewellyn Cooke, consulting engineer, and Director of the Giant Power Survey carried out in Pennsylvania during the Pinchot administration, has performed a very useful public service in presenting in this 26-page pamphlet a summary, with his conclusions, of an analysis of distribution costs of 45 privately owned and 19 publicly owned electric light and power plants. This important element in the making of rate schedules for the different classes of electric service is frequently held to be a justification for the wide spread between domestic and power rates, but the fact-basis has been meager. (Apply to the author, 1520 Locust Street, Philadelphia, Pa.)

Second Progress Report on Hudson River Bridge.—A 42-page booklet comprising a report by the Chief Engineer of Bridges of the Port of New York Authority, dated March, 1929, and describing the progress on the great suspension bridge under construction between New York City and Fort Lee, N. J. There are many illustrations, charts, etc. (Apply to the Authority, 75 West St., New York.)

Fiscal Relations Between the Government of the United States and the District of Columbia.—A report made by the United States Bureau of Efficiency and transmitted to the Committees of Appropriations of the Senate and the House of Representatives. Its 84 pages include a history of the fiscal relations of nation and district; explanation of a survey made by the Bureau of Taxation and the fiscal affairs of cities of the 300,000 to 1,000,000 group; brief comment; and 76 pages of tables, based on the survey. Complete tax data for Washington and for cities of comparable size had not hitherto been available. This is House Document No. 506. (Apply to Government Printing Office, Washington, D. C.

A Study of Child and Youthful Marriages in New York County.—A 30-page pamphlet made under auspices of the Committee on Correction, Women's City Club, of New York, and comprising a study of "child marriages" in New York County during 1925-1926, and their outcome. It records also an account of 100 girls, who falsified their ages during January, 1927; an examination of licenses issued under the new proof of age law in 1928 to learn how well it is being enforced; and a record of annulled marriages during 1925-1927, of persons under 18. (Apply to the Club, 22 Park Ave., New York.)

Other Reports Received

CALIFORNIA.—Biennial Report, Division of State Highways, Department of Public Works to June, 1928. 204 pp. with maps.

CANADA.—Annual Report, National Park Commissioner, to March 31, 1928. 40 pp.

CHICAGO, ILL.—Annual Appropriations, through March 30, 1929. 779 pp. (10 c. Municipal Reference Library, Chicago, Ill.)

CHICAGO, ILL.—Annual Report, Department of Weights and Measures, 1928. 12 pp.

CHICAGO, ILL.—Annual Message, Board of Forest Preserve Commissioners, Cook County, Ill. 16 pp.

DETROIT, MICH.—Annual Report, City Plan Commission, 1928. 22 pp., illus.

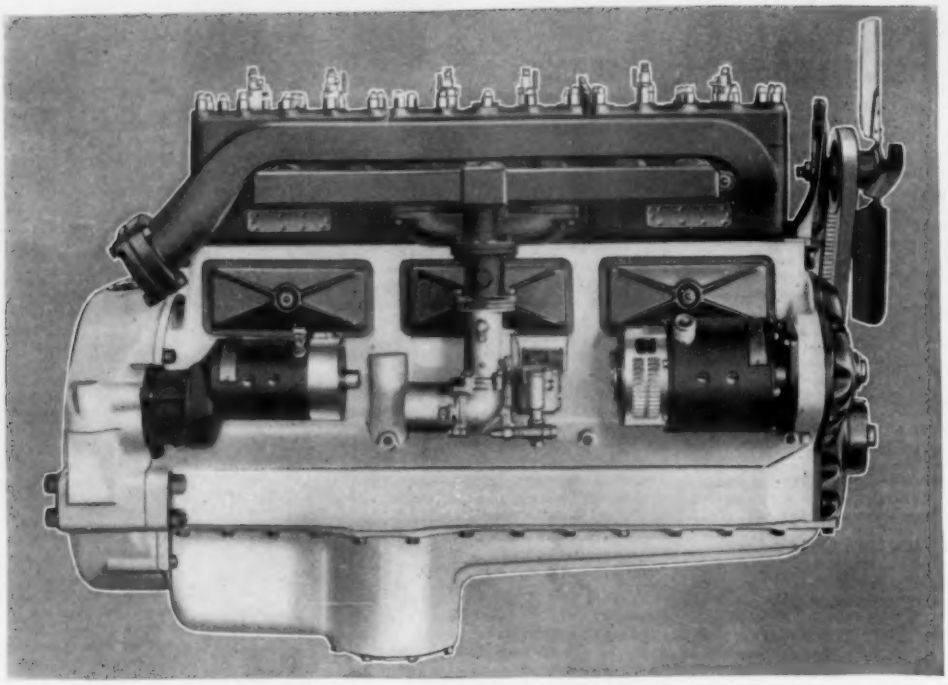
DISTRICT OF COLUMBIA.—Annual Report, Department of Weights and Measures, to June 30, 1928. 10 pp.

GARDNER, MASS.—Annual Report and Mayor's Message, 1928. 168 pp.

OAK PARK, ILL.—Annual Report, Department of Public Works, 1928. 70 pp.

OAK PARK, ILL.—Annual Report, Water Department, 1928. 24 pp.

SPRINGFIELD, MASS.—Annual Report, Water Commissioners, 1928. 100 pp.



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CONVENTIONS—WHEN AND WHERE

JUNE 3-6.—ATLANTA, GA.
International Association of Chiefs of Police. Annual convention. Secretary, George Black, Chief of Police, Wilmington, Del.

JUNE 3-7.—ATLANTIC CITY, N. J.
National Electric Light Association. Annual convention and exhibition. Secretary, A. Jackson Marshall, 420 Lexington Avenue, New York.

JUNE 4-7.—WASHINGTON, D. C.
National Conference on Weights and Measures. Annual conference. Secretary, F. S. Holbrook, Bureau of Standards, Washington, D. C.

JUNE 5.—CHICAGO, ILL.
Western Society of Engineers. Annual meeting. Secretary, Edgar S. Nethercut, 205 West Wacker Drive, Chicago, Ill.

JUNE 6.—NEW YORK.
National Automobile Chamber of Commerce. Annual meeting. General Manager, Alfred Reeves, 366 Madison Avenue, New York.

JUNE 7-8.—GLENS FALLS, N. Y.
New York State Secretaries' Conference. Annual meeting. Secretary-Treasurer, James Gheen, Chamber of Commerce, Albany, N. Y.

JUNE 10-11.—KEY WEST, FLA.
Florida State Commercial Secretaries Association. Annual convention. Secretary-Treasurer, Horace L. Smith, Secretary, Marion County Chamber of Commerce, Ocala, Fla.

JUNE 12.—ROCKLAND, ME.
Maine State Chamber of Commerce and Agricultural League. Joint meeting with the Rockland Chamber of Commerce. Secretary-Manager, A. L. T. Cummings, Room 49, City Hall, Portland, Me.

JUNE 12-14.—AUSTIN, MINN.
American Water Works Association, Minnesota Section. Annual meeting. Secretary-Treasurer, Ronald M. Finch, 240 South Fourth Street, Minneapolis, Minn.

JUNE 12-14.—AUSTIN, MINN.
League of Minnesota Municipalities. Annual convention. Executive Secretary, Morris B. Lambie, Chief, Municipal Reference Bureau, University of Minnesota, Minneapolis, Minn.

JUNE 13-15.—TROIS RIVIERES, QUE.
Union of Canadian Municipalities. Annual convention. Secretary, S. Baker, City Clerk, London, Ont.

JUNE 14-15.—MARBLEHEAD, MASS.
New England Association of Commercial Executives. Annual meeting. Secretary-Treasurer, H. A. Folsom, Box 631, Newburyport, Mass.

JUNE 18-20.—BINGHAMTON, N. Y.
New York State Conference of Mayors and Other City Officials. Annual meeting. Secretary, William P. Capes, City Hall, Albany, N. Y.

JUNE 23-25.—FOND DU LAC, WIS.
Wisconsin Association of Commercial Secretaries. Annual meeting. Secretary-Treasurer, Lee I. Yorkson, Wausau, Wis.

JUNE 24.—ON BOARD S. S. ST. LAWRENCE.
Union of the Municipalities of the Province of Quebec. Annual convention. Secretary-Treasurer, T. D. Bouchard, 132 St. Jacques Street, Montreal, Que.

JUNE 24-28.—SWAMPSCOTT, MASS.
American Institute of Electrical Engineers. Summer convention. National Secretary, F. L. Hutchinson, 33 West 39th Street, New York.

JUNE 24, WEEK BEGINNING.—TORONTO, ONT.
American Water Works Association. Annual convention. Secretary, Beekman C. Little, 29 West 39th Street, New York.

JUNE 24-29.—BOSTON, MASS.
National Association of Real Estate Boards. Annual convention. Executive Secretary, Herbert U. Nelson, Straus Building, Chicago, Ill.

JUNE 25-27.—CHICAGO, ILL.
International Association of Comptrollers and Accounting Officers. Annual convention. Secretary, Clifford E. Cook, City Auditor, Springfield, Mass.

JUNE 25-27.—GRAND RAPIDS, MICH.
Michigan Municipal League. Annual convention. Director, Harold D. Smith, University of Michigan, Ann Arbor, Mich.

JUNE 25-27.—NEW HAVEN, CONN.
New England Association of Fire Chiefs. Annual convention. Secretary, Chief John W. O'Hearn, Watertown, Mass.

JUNE 26-28.—CALGARY, ALBERTA.
Union of Alberta Municipalities. Annual convention. Secretary, J. D. Saunders, Camrose, Alberta.

JUNE 26-28.—CLEVELAND, OHIO.
American Society of Landscape Architects. Annual meeting. Executive Secretary, Bradford Williams, 9 Park Street, Boston, Mass.

JUNE 26-28.—PRINCE ALBERT, SASK.
Union of Saskatchewan Municipalities. Annual convention. Secretary-Treasurer, W. E. Hodge, 227 Main Street, Moose Jaw, Sask.

JUNE 26-JULY 3.—SAN FRANCISCO, CALIF.
Association of Community Chests and Councils. Annual meeting. Executive Director, Allen T. Burns, Graybar Building, 43d Street and Lexington Avenue, New York.

JUNE 26-JULY 3.—SAN FRANCISCO, CALIF.
National Conference of Social Work. Annual conference. General Secretary, Howard R. Knight, 277 East Long Street, Columbus, Ohio.

JUNE 28-JULY 4.—ATLANTA, GA.
National Education Association of the United States. Annual meeting. Secretary, J. W. Crabtree, 1201 16th Street, N. W., Washington, D. C.

JULY 1-2.—BUFFALO, N. Y.
American Automobile Association. Annual meeting. General Manager, Ernest N. Smith, Pennslyvania Avenue at 17th Street, Washington, D. C.

JULY 8-13.—AMSTERDAM, HOLLAND.
International Chamber of Commerce. Congress. Manager, American Section, John P. Gregg, Connecticut Avenue and H Street, N. W., Washington, D. C.

JULY 9-10.—SAN ANTONIO, TEXAS.
Chiefs of Police and City Marshals Association of Texas. Annual convention. Secretary, George A. Smith, P. O. Box 299, Dallas, Texas.

JULY 10-12.—MILWAUKEE, WIS.
American Society of Civil Engineers. Annual convention. Secretary, George T. Seabury, 33 West 39th Street, New York.

JULY 14-20.—PALO ALTO, CALIF.
Western School for Commercial Secretaries. Annual session. Manager, Roy W. Smith, Palo Alto, Calif.

JULY 16-19.—CLEVELAND, OHIO.
Ohio Police Chiefs' Association. Annual convention. Secretary-Treasurer, E. G. Krause, 1020 Guardian Building, Cleveland, Ohio.

JULY 23-25.—CORTLAND, N. Y.
New York State Association of Chiefs of Police. Annual convention. Secretary-Treasurer, James L. Hyatt, Police Department, Albany, N. Y.

JULY 23-25.—BETHLEHEM, PA.
Pennsylvania Chiefs of Police Association. Annual convention. Secretary-Treasurer, J. N. Tillard, Chief of Police, Altoona, Pa.

AUGUST 4-17.—EVANSTON, ILL.
National School for Commercial and Trade Organization Executives. Annual session. Secretary-Treasurer, John N. Van der Vries, 134 North La Salle Street, Chicago, Ill.

AUGUST 20-22.—FORT DODGE, IOWA.
League of Iowa Municipalities. Annual meeting. Secretary-Treasurer, Frank G. Pierce, Marshalltown, Iowa.

AUGUST 20-22.—ESCANABA, MICH.
Michigan Association of Chiefs of Police. Annual meeting. Secretary-Treasurer, Alfred Seymour, Chief of Police, Lansing, Mich.

AUGUST 20-22.—PICTOU, NOVA SCOTIA.
Union of Nova Scotia Municipalities. Annual convention. Secretary, Arthur Roberts, K. C., Bridgewater, N. S.

AUGUST 25-27.—MEXICO CITY, MEX.
American Association of Engineers. Annual convention. Secretary, M. E. McIver, Willoughby Tower, Michigan Boulevard at Madison Street, Chicago, Ill.

AUGUST 27-29.—SALT LAKE CITY, UTAH.
United States League of Local Building and Loan Associations. Convention. Secretary, H. F. Cellarius, 22 East 12th Street, Cincinnati, Ohio.

SEPTEMBER 3-5.—SAN FRANCISCO, CALIF.
National Association of State Auditors, Comptrollers and Treasurers. Annual convention. Secretary, Hon. S. H. Blau, State Auditor, Montgomery, Ala.

SEPTEMBER 9-14.—UPPER SARANAC, N. Y.
National Tax Association. Annual meeting. Secretary, W. G. Query, Chairman, South Carolina Tax Commission, Columbia, S. C.

SEPTEMBER 12-22.—ROME, ITALY.
International Federation for Housing and Town Planning. Congress. Organizing Secretary, H. Chapman, 25 Bedford Row, London, W.C.1, England.

SEPTEMBER 17-20.—PORTLAND, ME.
New England Water Works Association. Annual convention. Secretary, Frank J. Gifford, 715 Tremont Temple, Boston, Mass.

SEPTEMBER 20-26.—TORONTO, ONT.
American Prison Association. Annual congress. General Secretary, E. R. Cass, 135 East 15th Street, New York.

SEPTEMBER 24-27.—PHILADELPHIA, PA.
Illuminating Engineering Society. Annual convention. General Secretary, A. B. Oday, 29 West 39th Street, New York.

SEPTEMBER 30, WEEK OF.—MINNEAPOLIS, MINN.
American Public Health Association. Annual meeting. Executive Secretary, Homer N. Calver, 370 Seventh Avenue, New York.

SEPTEMBER 30-OCTOBER 4.—CHICAGO, ILL.
National Safety Council. Annual safety congress. Managing Director, W. H. Cameron, 108 East Ohio Street, Chicago, Ill.

OCTOBER 14-16.—JACKSONVILLE, FLA.
International Association of Street Sanitation Officials. Annual convention. Secretary, A. M. Anderson, 100 North LaSalle Street, Chicago, Ill.

OCTOBER 14-17.—TULSA OKLA.
Southwest Water Works Association. Annual convention. Secretary, Lewis A. Quigley, Fort Worth, Texas.

OCTOBER 14-18.—PHILADELPHIA, PA.
American Society for Municipal Improvements. Annual convention. Secretary, C. W. S. Sammelman, 315 Commercial Building, St. Louis, Mo.

OCTOBER 14-19.—LOUISVILLE, KY.
Playground and Recreation Association of America. Annual convention. Secretary, Howard S. Braucher, 315 Fourth Avenue, New York.

OCTOBER 20-23.—MILWAUKEE, WIS.
National Association of Commercial Organization Secretaries. Annual convention. Secretary-Treasurer, S. V. Saxby, Chamber of Commerce, Duluth, Minn.

OCTOBER 22-25.—BIRMINGHAM, ALA.
International Association of Fire Chiefs. Annual convention. Secretary, James J. Mulcahey, Fire Chief, Yonkers, N. Y.

NOVEMBER 12-14.—CHICAGO, ILL.
National Municipal League. Annual convention. Secretary, Russell Forbes, 261 Broadway, New York.

NOVEMBER 18-21.—MIAMI, FLA.
American Institute of Park Executives and American Park Society. Annual convention. Executive Secretary, William H. Walker, South Bend, Ind.

NOVEMBER 20-23.—FORT WORTH TEXAS.
International City Managers' Association. Annual convention. Executive Secretary, Clarence E. Ridley, 923 E. 60th Street, Chicago, Ill.

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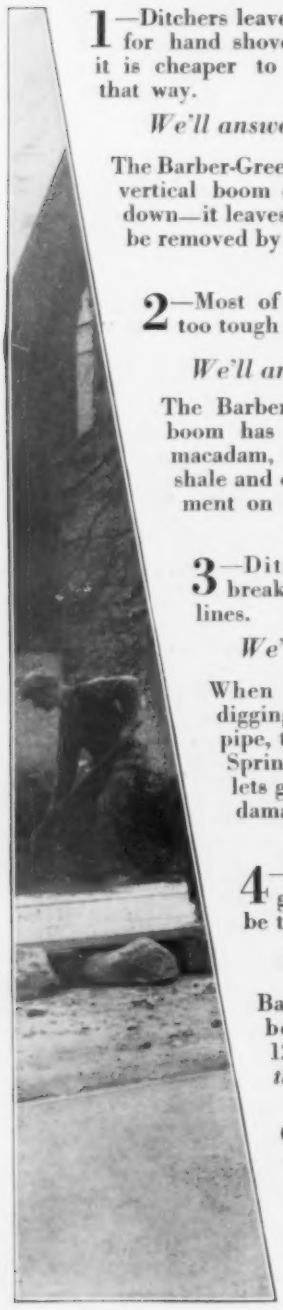

1—Ditchers leave so much for hand shovelers that it is cheaper to do it all that way.

We'll answer that:

The Barber-Greene patented vertical boom digs straight down—it leaves no ramps to be removed by hand.

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The Barber-Greene vertical boom has milled through macadam, brick, hardpan, shale and even cement pavement on many jobs.

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4—We have so little digging, that a ditcher would be too expensive.

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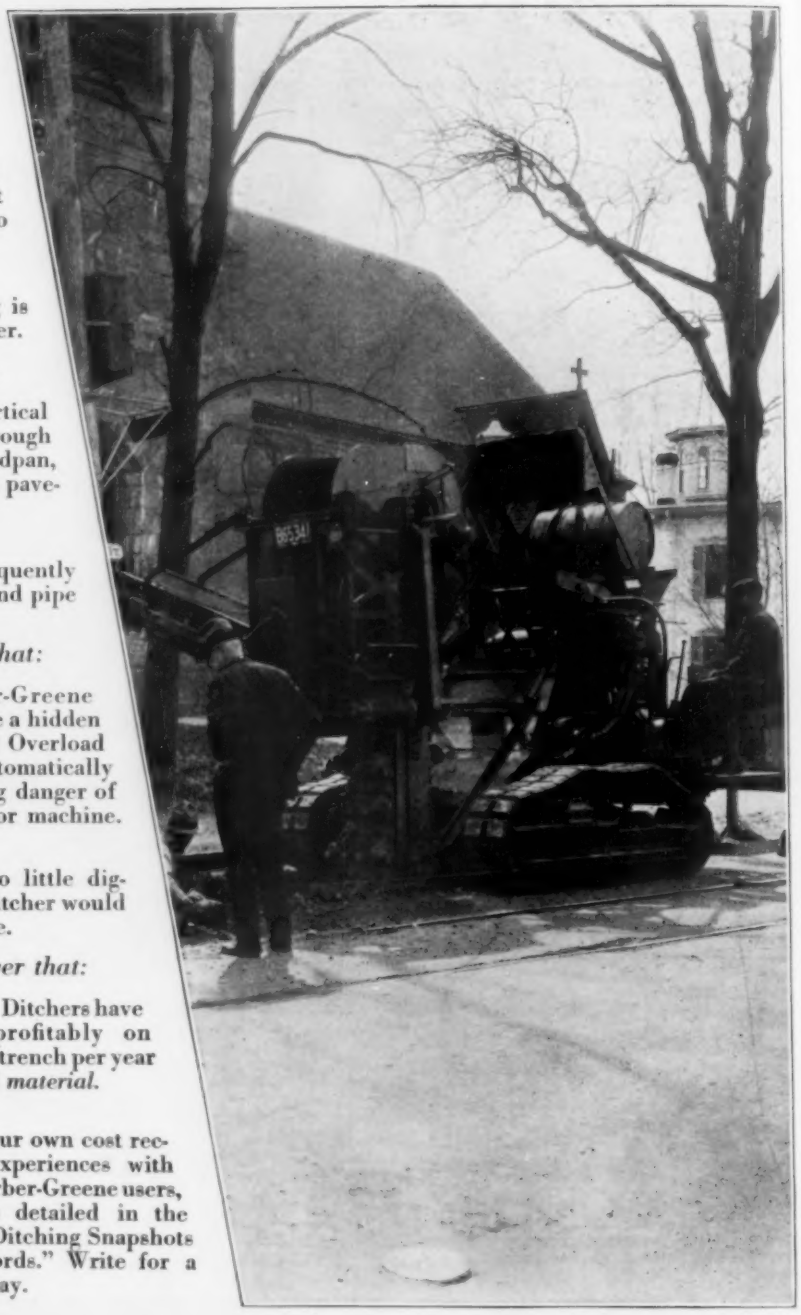

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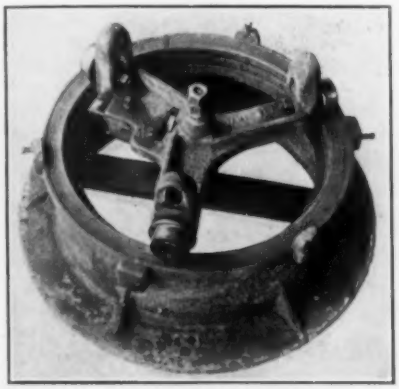
NEWS AND ILLUSTRATIONS

Items *of* Interest *to* City, Town *and* County Officials, *and* Others Concerned *with the* Economical Construction *and* Efficient Operation *of* Public Improvement Undertakings

Rocking Manhole Covers Cured

One of the most annoying and most needless street noises is the rocking manhole cover which delivers a distinct penetrating sound every time an automobile or truck wheel passes over it. The C. H. Lyne Foundry & Machine Co., 105-109 N. W. Fifth Street, Miami, Fla., has rendered a distinct service to residents and to business houses near rocking manhole covers by developing a hand-surfacing machine for trueing up manhole castings. This machine can be taken to any standard manhole, even if it is set in the street, and in 30 minutes will true up the manhole ring as well as though the ring had been removed and taken to a machine shop.



THE LYNE HAND MACHINE FOR TRUING MANHOLE CASTINGS

For this work no skilled labor is required and any man of ordinary intelligence can operate the machine. The lids can easily be faced in a machine shop or through the use of a power-driven machine known as the Lyne surfacing machine. This outfit will machine both the ring and the cover, but is not designed to be taken out on the job, unless with electric light companies, which have power in the manholes. In that case the power machine is ideal. The machine makes it possible for a city to purchase rough manhole castings and machine them in the city yard for less than a dollar for the manhole of two pieces.

Within six months 2,000 sets of manholes have been machined in Miami, averaging 18 complete sets, or 36 pieces, per day of 9 hours. The best record was 44 pieces in 9 hours, but the 36-piece record was taken from a week's run.

New B. B. T. Representatives

In order to establish as close contact as possible with the individual airports throughout the country and to give prompt service at all times, the B.B.T. Corporation of America, Atlantic Building, Philadelphia, Pa., has developed an organization of district representatives for the distribution and servicing of B.B.T. airport lighting equipment. Each representative is either a trained aviation lighting specialist or has trained one particular man in his organization along these lines.

The representatives are: Air Associates, Inc., 535 Fifth Ave., New York; J. E. Cameron, 407 E. 13th St., Kansas City, Mo.; Commonwealth Electric Co., St. Paul, Minn.; Electron Engineering Co., Inc., 1812 Masonic Temple, New Orleans, La.; Filer-Perry Equipment Co., 24 N.W. First Ave., Miami, Fla.; F. A. Hamilton, 315 Sutter St., San Francisco, Calif.; Industrial Sales Co., Inc., 309 S. 13th St., Omaha, Neb.; The Otto K. Olesen Illuminating Co,. 1560 Vine St., Hollywood, Calif.; H. B. Squires Co., 552 First Ave., South, Seattle, Wash.; Wings, Inc., 309 Dearborn Bldg., Dearborn, Mich.; E. C. Baugher, 40 Court St., Boston, Mass.; A. C. Emerson, 310 S. Michigan Blvd., Chicago, Ill.; and the Taylor and Arnold Supply Co., 756 Victoria Square, Montreal, Que., exclusive representatives for all of Canada.

A Fire Apparatus Operator's Manual

The operators' manual furnished to all users of motor fire apparatus made by the American-LaFrance & Foamite Corp., Elmira, N. Y., has this preface:

"The value of fire apparatus to any community is entirely dependent upon the care and attention continuously given to its proper adjustment and upkeep, as well as the skill with which it is handled and operated.

"The saving of lives and property is a matter within your hands in the hour of need and whether you succeed or fail is largely determined by the promptness of your response to an alarm and the efficiency of the apparatus thereafter.

"The importance of your calling, the universal pride and interest taken by everyone in fire apparatus and the time at your disposal all justify nothing short of perfection.

"Regardless of the great ruggedness, simplicity and massive strength incorporated in our apparatus, nevertheless, it is still a piece of machinery and, as such, must be handled with a reasonable amount of intelligence and skill.

"In spite of good care accidents occur and in time parts need replacement. Then, the fire apparatus manufacturer must be ready to serve promptly. After the fire, the excuse 'The pumper was laid up for repairs' will not absolve the fire department from the blame by citizens who had depended upon its protection."

To meet emergencies more than 50 American-LaFrance service engineers are ready to answer calls. More than half a million dollars' worth of parts are stocked at branches throughout the country and a service record of parts is kept for every piece of apparatus that leaves the factory, so that replacement parts may be ordered easily and shipped promptly.

Union Metal Opens Three New Sales Offices

The opening of three new district sales offices has been announced by The Union Metal Manufacturing Co., Canton, Ohio. These offices will serve as sales headquarters for Union Metal street-lighting standards, fluted steel poles and exterior lighting fixtures and King Ferronite lighting standards.

The Southeastern district office is in charge of C. A. Williams, 1508 Candler Building, Atlanta, Ga. L. Mitchell has charge of the Southwestern office with headquarters at 728 Allen Building, Dallas, Texas. The Boston office is in charge of E. H. Bradley, 378 Stuart St., Boston, Mass. Other Union Metal district offices are located at New York, Chicago, Philadelphia, Cleveland, Los Angeles, Seattle and Canton, Ohio.

Chicago Company Opens Pump School

The Chicago Pump Co., 2336 Wolfram St., Chicago, Ill., has announced that it has started a school of instruction in the manufacture and merchandising of electric centrifugal pumps. The students are new representatives and representatives' salesmen. The course is intensive and is designed to educate the new men of the organization in the details of production, application of pumps and information necessary to properly figure a pump job.

Clark Heads Consulting Service Department

A new service has recently been inaugurated by the Michigan Valve & Foundry Co., Detroit, Mich., whereby technical advice is made available to those in charge of projects involving water-supply and distribution, drainage and sewage projects, particularly where piping is an important factor.

The administration of this service has been given to Eldon S. Clark, an engineer who has been associated with many important projects in the east, among them, Waterville, Me., Plattsburgh, N.Y., Hopedale, Mass., Quincy, Mass., Revere, Mass., Concord, N. H., and Johnstown, Pa.

In all weather . . . under the most trying conditions . .

Model LH TRACKSON
McCORMICK-DEERING

CONTRACTING

ROAD BUILDING

INDUSTRIAL

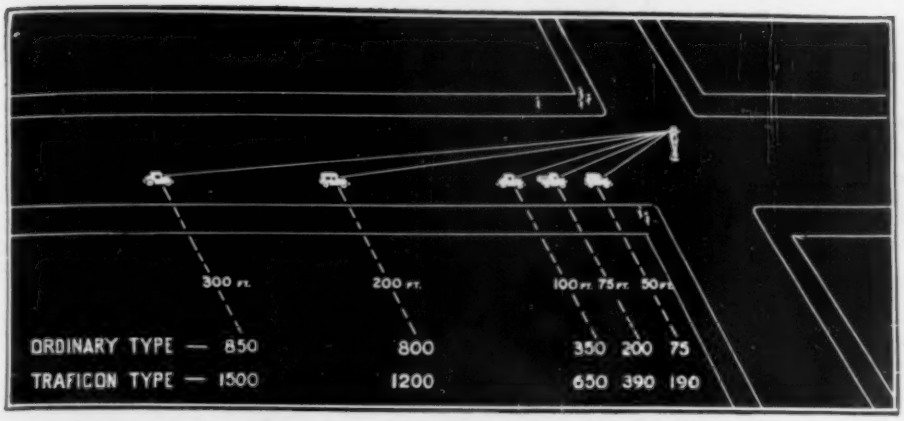
is the Outstanding Universal Full-Crawler on the Market Today!

YOUR profit depends on jobs efficiently and economically done. The difference between profit and loss lies in labor-saving . . . in how quickly, steadily your tractors and equipment can work and still "stand the gaff." The Model LH was built to meet your demand for this kind of equipment. Light in weight, yet it is so constructed as to give tremendous traction and irresistible power in slippery, soft or loose footings. The LH retains the standard traveling speeds of the Model 20 McCormick-Deering (agricultural) Tractor, and turns in its own length, pivoting on the inside track. Ease of handling has been combined with amazing power and traction. Use the LH all year 'round in all weather, to cut costs . . . with road machinery, earth-moving equipment or snowplows. Let us give you complete details of its low first cost and astonishing economy of operation and maintenance. Write . . . NOW!

Trackson Company
FULL-CRAWLERS & TRACTOR EQUIPMENT
518 CLINTON ST. MILWAUKEE, WIS.

MODEL LH TRACKSON McCORMICK-DEERING

Mention THE AMERICAN CITY—it helps.



COMPARATIVE EFFECTIVENESS OF ORDINARY TYPE OF SIGNAL AND TRAFICON TYPE AT DIFFERENT POINTS ALONG THE STREET

Light Distribution Requirements for Traffic Signals

When cities began to direct traffic with colored signal lights, they first used lenses, which railroads had found so successful for that purpose. It was soon found, however, that railroad semaphore lenses were but ill adapted to the needs of motor traffic direction on city streets. The colors red for stop, amber for caution and green for go are satisfactory, but the railroad signal lenses are far too concentrating for city use, and they allow half of the light to be wasted above a horizontal plane. To remedy the excess concentration by lenses and parabolic reflectors, diffusing roundels and diffusing plates are widely used. These give a greater spread of light, but they do not give the exact distribution required, and they also suffer from the loss of half the light upward. The Holophane Co., 342 Madison Avenue, New York, has developed Traficons for stop and go signals to give the proper light distribution efficiently.

Consider the light distribution requirements for a signal mounted over the center of a street intersection. This location is the one most frequently used, and a signal which gives the proper distribution of light from a center location will also give a satisfactory distribution of good efficiency when located near the curb. The first illustration shows a typical street with a signal at the center of the intersection. The zones in which the signal must be effective, and a general idea of the angles at which the light must leave the signal, are indicated.

The second illustration shows an ideal light distribution. Far down the street the intensity or candlepower of the beam must be most powerful, but the spread required is small. Nearer the signal the intensity of the beam may be less, but the spread must be wider and the angle down from the horizontal greater. Still closer to the signal the intensity may be much less, but the spread required is very wide and the light must be sent down at a considerable angle below the horizontal. Thus, as the angle measured down from the horizontal increases, the candlepower should decrease, but lateral or sideways spread of the light should increase.

The Holophane engineers have produced the required results in distribution and appearance by devising two new types of prismatic formations. In one of these formations several sets of parallel prisms cross the lens diagonally at various angles so that at least one set is always delivering light in the direction required. This is known as the "lattice" prism construction because the complete figure resembles a lattice-work design. The lattice prism is supplied by the Holophane Co.—through the General Electric Co., exclusively. Traficons of this design are known as Refracticons because their effect depends upon the refraction produced by the prisms. General Electric Novalux traffic signals are equipped with Holophane Refracticons.

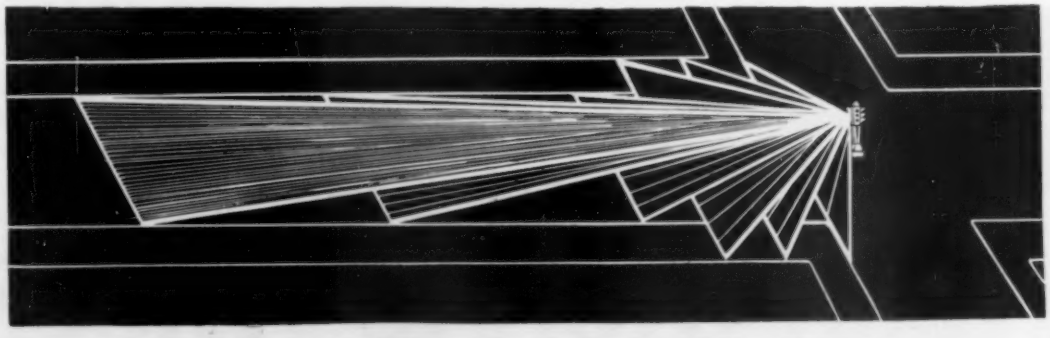
The Refracticon roundel is 8⅜ inches in diameter and is a single piece of glass. The outside surface is smooth, and the inside surface is provided with Holophane lattice prism construction, described above. This roundel is used in front of a parabolic reflector.

A New Sewer Pipe Joint Material

An asphaltic product for making leak-proof sewer pipe joints has been developed by the Standard Oil Co. of Indiana, 910 South Michigan Avenue, Chicago, Ill., under the trade name No. 1 Korite. No. 1 Korite is said to make a permanent tight joint and to prevent the leakage, infiltration and choking of pipes by roots. The material can be chopped up and melted in a suitable kettle at a temperature from 250 to 350 degrees Fahrenheit, according to weather conditions, but the lowest temperature possible to properly pour the joint is recommended.

Before the making of the joints the outside of the spigot on the end of the pipe and the inside of the bell of the pipe are swabbed or brushed with a thin coating of hot Korite, which is allowed to stand for approximately 15 minutes until it sets or hardens. The pipe is then lowered into the trench and put together and laid in the usual manner. Oakum is carefully and tightly calked in the space of the joints, leaving at least 1½ inches open space for sealing with the joint material. A joint runner made of asbestos rope or the standard water pipe joiners can be used. If the joint runner is lightly swabbed with kerosene, a lubricating oil or grease, the oil coating will prevent the hot Korite from sticking to the runner.

In making the joints, considerable care must be used in adjusting the joint runner around the pipe. It should be tight at the bell of the pipe so that the hot material will not run through to the ground and be lost or wasted. After the runner is adjusted, the junction between the pipe and the runner can be made tight by smearing the joint between the joint and the runner with moist clay, which must not be allowed to get into the joint that is being poured nor to come in contact with the stream of hot Korite, as this will cause foaming and result in an ineffective joint. This joint material cools in about 15 minutes, after which the joint runner can be removed.



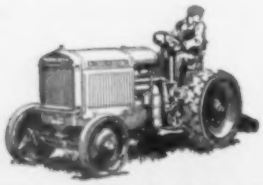
LIGHT DISTRIBUTION OF TRAFICONS FOR TRAFFIC SIGNALS

INTERNATIONAL

TWENTY-FIVE YEARS—

—or an afternoon

Besides Heavy-Duty Trucks, the International line includes the ¾-ton Special Delivery, the 1-ton Six-Speed Special, and Speed Trucks for 1¼, 1½, and 2-ton loads. Backing the trucks is an unequaled service organization—there are now 172 Company-owned branches in the United States and Canada. Write for truck catalog.



McCormick-Deering Industrial Tractors—ideal mobile power for hundreds of jobs. Write for booklet "Tractor Power in Industry."

Bear this in mind when you are looking toward Heavy-Duty Truck purchase and want the facts before you: Any Harvester branch or truck dealer will demonstrate an International for you at any time, right in your everyday work.

Whatever the nature of your hauling and your loads, we will put at your disposal an International of the size you need and let you compare its all-around performance with anything you are doing now or want to do.

Take that as the evidence of an *afternoon,* or a day or two, if longer time may be necessary. And take with it the evidence of the *twenty-five years* that the Harvester Company has been building trucks to do a truck's work as it should be done.

You owe it to your business to know this new International Heavy-Duty line with the new engines, new clutches, new transmissions, increased capacities, double reduction or chain final drive. All models have five speeds forward and two reverse, and 4-wheel brakes. The sizes range from 2½ to 5-ton. Speed dump trucks, also, down to 1-ton capacity.

Accept our invitation to *prove* this product of twenty-five years of progress in truck manufacture.

INTERNATIONAL HARVESTER COMPANY
OF AMERICA
(INCORPORATED)
606 So. Michigan Ave. Chicago, Illinois

INTERNATIONAL TRUCKS

A Three-Unit Portable Asphalt Plant

Portable asphalt plants made up in three units each to speed moving them when necessary, have been announced by the F. D. Cummer & Son Co., Cleveland, Ohio. These plants are made up as 400-, 1,000-, 1,600-, and 2,200-yard outfits.

The first unit of the 1,000-yard plant is composed of one Cummer two-fire sand and stone dryer with a capacity of 12 tons of sand per hour, a 1,000-pound batch mixer, a 12-ton sand bin with rotary screens, jacketed when desired, and the bins in one, two, three or four compartments (standard equipment is three compartments), an open measuring box on the charging beam scales arranged so that each ingredient can be weighed separately or combined, and a 150-pound asphalt bucket on a 2-beam scale. The second unit is composed of the boiler and engine. The boiler is a 50-horsepower portable locomotive type unit operating at 125 pounds pressure. A 40-horsepower engine is used or a 40-horsepower electric motor. The boiler has ample capacity for supplying steam for tank cars or for other regular service where steam is required about the plant. The third unit in this Cummer plant is the one-fire melting kettle of 12 tons capacity. This may also be a steam melting kettle of the same capacity if desired.

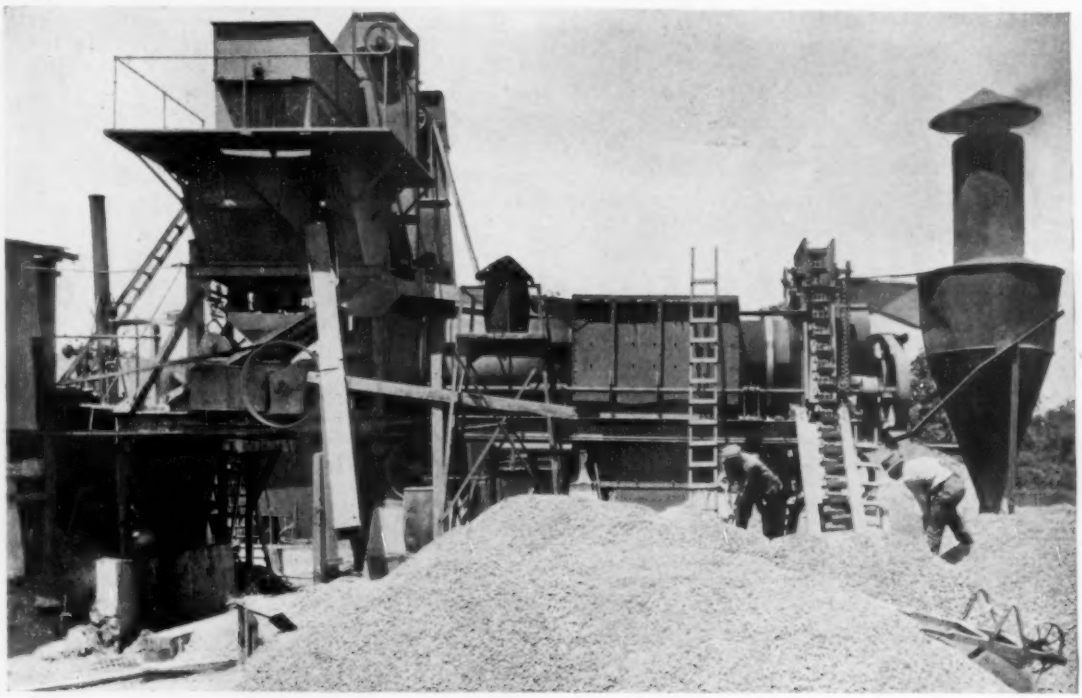
The new two-fire dryer is claimed to embody the advantages of both the internal and the external fire types. The cylinder revolves on steel tires and rollers placed close to the front or feed end and to the discharge end, and it is driven by suitable gears. The front end of the cylinder, except that part occupied by the front tire and supporting rollers, is enclosed by a fire-brick and asbestos-lined casing for about one-half its length, and this portion of the cylinder has heat inlet holes cut in its walls. These heat inlet openings are covered on the inside by hoods which allow the heat to enter but prevent materials from leaking out. The rear half of the cylinder is not enclosed, but is suitably insulated. The rear end of the cylinder is closed by a breeching to which an oil-burning combustion chamber is fitted.

The casing around the front half of the cylinder extends considerably below the cylinder and forms a coal-burning furnace. At the forward end of this coal-burning furnace is fitted an oil-burning combustion chamber. Either coal or fuel oil can be burned, but oil is preferable.

This construction of the front half of the drying cylinder with the heat inlet openings and fire-brick-lined casing is the same as has been used on Cummer dryers in the past. A fan is attached to the breeching at the front or feed end of the cylinder to supply an induced draft to the furnace and to draw the heat through the inlet openings and also to carry off the water vapor.

The wet sand and stone are fed through a feed mouth in this breeching. As the wet material enters the drying cylinder, it is met by a blast of hot, dry air from the first hood, and as it travels toward the discharge end, it is met by fresh blasts of hot, dry air from each succeeding hood. These hoods are placed at intervals of about 18 inches. Because of the fact that the material entering the drying cylinder is wet and cold, the heated air from the first hood quickly becomes saturated with moisture and loses its heat. It is then drawn out by the fans. The heated air from the following hoods loses its heat more slowly and stays in the cylinder a correspondingly longer time as the drying material works toward the discharge end, constantly becoming warmer and dryer.

The drying cylinder is designed so that the sand and stone will be warmed and almost dry before it passes the last heat inlet, and the material then passes rearward into the drying heat from the rear oil combustion chamber. By regulating the supply of oil to this combustion chamber the dried material can be discharged at any desired temperature from 200 degrees Fahrenheit to 50 degrees Fahrenheit. The temperature of the sand and stone as it is discharged from the dryer is registered by a thermometer on the mixer platform in plain view of the mixer man, and, as he is responsible for the temperature of the asphalt mixture, he also has control of the oil supply to the rear combustion chamber, so that he can at all times have the sand and stone discharged into the storage bins over the mixer at the proper temperatures.



THE COMPLETE 3-UNIT CUMMER 1600-YARD PORTABLE ASPHALT PLANT

Water Supply Statistics

The water-supply statistics of 4,300 American cities are available in pamphlet form, at a price of two dollars, from THE AMERICAN CITY, 443 Fourth Ave., New York.

The Kellogg Fleet at Battle Creek, uses many types of tires, all Goodyears

100,000 miles since 1922 *is the record of the set of Goodyear Tires on this truck, according to the Kellogg Company*

Kellogg's found *the right tire for every car or truck is* Goodyear

Heavy truck, light truck, sales car—every vehicle in the Kellogg fleet from coast to coast rides on Goodyear Tires.

The cost per mile, the freedom from delays, the convenience of service facilities—all these factors entered into the choice.

There are Goodyear Heavy Duty Cushions, for bulky loads on city streets; Goodyear Hollow Center Cushions on front wheels for easy riding; Goodyear All-Weather Tread Pneumatic Truck Tires for increased speed and traction; Goodyear All-Weather Tread Passenger Car Tires on salesmen's cars. "After having tried out a number of kinds of tires," says the Kellogg Company, "it is the verdict among our men that Goodyears give the longest wear and the best of service."

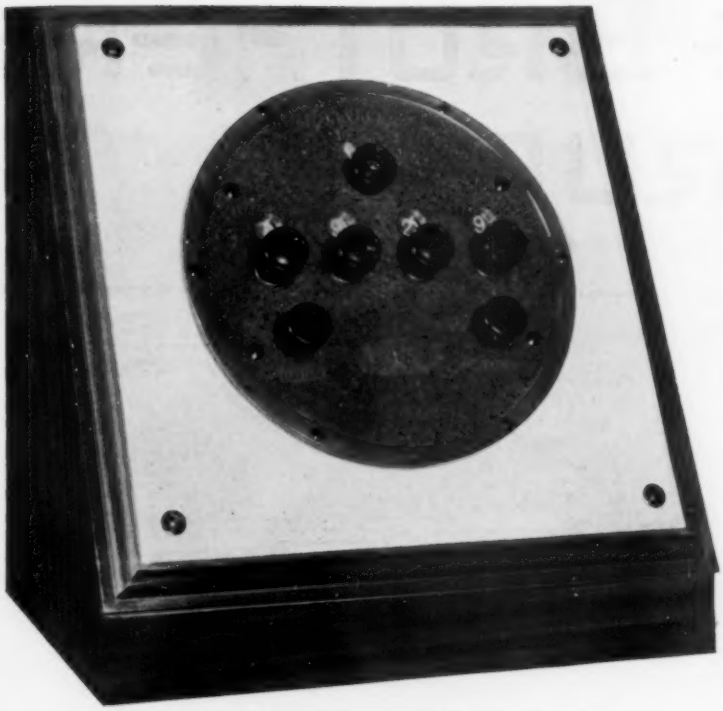
The famous All-Weather traction of the Goodyear tread—and the extra-vitality, extra resilience and longer life of SUPER-TWIST in Goodyear pneumatics, have again shown that they deliver the proper combination of tractive power, low operating cost and mileage.

No matter what or where you haul, Goodyear builds the *right* tire for your hauling requirements. Goodyear Truck Tire Service Station Dealers everywhere are ready to give you prompt, helpful and competent service.

More Tons Are Hauled on Goodyears Than on Any Other Tires

GOODYEAR

Copyright 1929, by The Goodyear Tire & Rubber Co., Inc.



THE 1929 MODEL GAMEWELL PEERLESS TRANSMITTER

A Fire-Alarm Transmitter

The Peerless transmitter for use in automatic, semi-automatic and manual fire-alarm central offices to transmit box and telephone alarms to engine-houses and to the public fire-alarm apparatus, has been announced in its 1929 Model by the Gamewell Co., Newton Upper Falls, Mass.

The dial of this transmitter is made of Bakelite, on which are mounted five knobs and two push buttons. The knob at the extreme top of the dial regulates the number of rounds of the signal. By simply turning this knob to the desired number the signal can be transmitted one, two, three or four times.

The signal numbers are set up on the four knobs located in a row across the center of the dial. Above each knob is a circular opening in the Bakelite dial exposing in red figures on an aluminum background the number set up on the knobs. Signals are set up from left to right. The first knob on the left is always ready to set, while the other three are normally disconnected and can be set only after the knob to the left of each has been moved from zero. After the second knob is set, the first is locked, while the setting of the third knob locks the second, etc. This feature prevents unintentional moving of the knobs after they have once been set. The signal is transmitted by operating a button on the lower right of the dial. All the number knobs are immediately restored to the zero position by operating the restoring button on the lower left of the dial. This allows rapid setting-up of two or more signals and also provides a convenient means of stopping a signal should it be found that the wrong number was set up. If the restore button is operated while a signal is being transmitted, all knobs are restored to zero position and no further blow is transmitted. The round setting knob can then be turned to the first position, bringing the mechanism to a stop at the end of the round then being transmitted.

Where a number consisting of only one, two or three digits is to be transmited, it is only necessary to use the corresponding number of knobs, always starting with the first knob at the left. The first knob is also arranged to transmit ten or more straight blows for a special code signal by rotating it more than once around.

The round setting knob may always be changed to a smalier number of rounds even while a signal is being transmitted, but should never be changed to a larger number while the machine is operating.

The transmitter mechanism is wound by means of a shaft in the center of the round setting knob. A key similar to that used upon gongs and registers is also utilized on the transmitter. The spring has a capacity of 24 rounds, but should be wound after every alarm.

The non-interfering and successive functions are the same as for the Peerless fire-alarm box, including the quick succession feature of trying to obtain the line at the beginning of every round. While the main spring has a capacity of 24 rounds, the movement is designed to stop if it operates for 16 rounds while prevented from sending its signal on account of other box having control of the line or the line being open, thus assuring that the transmitter will always have capacity for a second signal even if allowed to run the full sixteen rounds without sending a signal and if the operator neglects to wind the mainspring. The transmitter can be supplied for open-circuit local battery operation as required for manual central offices. In this case the non-interfering features are omitted.

Sullivan Machinery Company Moves General Offices

The Sullivan Machinery Co., formerly located at Peoples Gas Building, 122 South Michigan Avenue, has moved its general offices and all departments to new quarters on the seventh and eighth floors of the Wrigley Building, 400 North Michigan Avenue, Chicago, Ill.

Morgan Joins Chicago Pump Company

The Chicago Pump Co., 2336 Wolfram Street, Chicago, Ill., has announced the appointment of W. T. Morgan as Manager of Engineering Service at the New York office of the company. Mr. Morgan was formerly with Goulds Pumps, Inc.

A Self-Loading, Rear-Dump, Two-Wheel Scraper

A two-wheel scraper which is self-loading, rear-dump, and operated by one man, is manufactured by the Highway Trailer Co., Edgerton, Wis. This scraper, which ranges in size from 2 cubic yards to 5½ cubic yards capacity, is a compact unit of

A CLEAN CUT MADE BY THE NEW HIGHWAY SCRAPER

OPERATED BY THE MAN WHO RUNS THE TRACTOR

scraper and trailer which can be turned around in a 24-foot circle. The scraper pan is carried on an axle in a channel steel frame, supported by two wheels and hooked to the tractor by a drawbar and pin. Power is taken from the rear of the tractor and transmitted to the transmission

DODGE BROTHERS TRUCKS

CHRYSLER MOTORS PRODUCT

For your greater profit-- put Dodge Trucks to work

WORK is the sole function of any motor truck as profit is the ultimate aim of any business. Work—its quality, its quantity, its cost—must be the true measure of motor truck value.

From drawing board through to factory gate the experienced brains and skilled hands of the builders of Dodge Trucks are guided by consideration of the work each truck must do for an owner. And world-wide Dodge service is ready, always, to keep them at work.

Hundreds of thousands of Dodge Brothers Trucks are in use by owners who prefer Dodge Trucks. Repeated purchases prove this preference. Each appraises work in his own way—yards hauled, miles run, power, speed, economy, reliability, freedom from layup. For your greater profit—whatever your trucking needs—put Dodge Trucks to work for you.

PRICES

MERCHANTS EXPRESS—109″ w.b.	$ 545
COMMERCIAL TRUCK—120″ w.b.	775
1-TON—130″ wheelbase	995
1-TON—140″ wheelbase	1065
1½-TON—150″ wheelbase	1345
1½-TON—165″ wheelbase	1415
2-TON—150″ wheelbase	1515
2-TON—165″ wheelbase	1585
3-TON—135″ wheelbase	1745
3-TON—165″ wheelbase	1775
3-TON—185″ wheelbase	1845

Chassis f. o. b. Detroit

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE

When you write for that catalog, kindly mention THE AMERICAN CITY.

IN SERVICE ON HIGHWAY GRADING

SPREADING A LOAD

of the scraper by means of a compound universal joint and drive-shaft. By use of two levers, the power is distributed to the rakers by sprockets and chains, and to raising and lowering the pan by means of steel cables winding in sheaves.

All wearing parts are of manganese steel. The cutting bit of plow steel is reversible and can be quickly changed. The transmission shafts are equipped with Alemite fittings, and all transmission gears operate in oil.

One man is able to handle the whole job, and can pick up and load an average load of material in approximately one minute. When ready to load, the pan is lowered to the desired depth and the rakers pull the dirt back from the bit, rising with it. When the pan is full, it is up-ended and wheeled any desired distance, and a pull of the rope releases the latch of the dumping-door. All of this takes place without the driver leaving his seat, and round after round can be made without stopping the progress of the tractor.

New Device Permits Vehicles to Operate Traffic Signals

Considerable criticism has been aimed at many cities, and particularly at communities on through routes, where traffic signals have been operated automatically by timing devices that gave practically equal traffic flow periods to through traffic and the lesser volume of cross-traffic. The Automatic Signal Corporation, 205 Church St., New Haven, Conn., has developed an apparatus which permits continuous flow of traffic along the main artery interrupted only when vehicles from the cross-street actuate the device set in the pavement which changes the signal for only a predetermined period, sufficient to let the cross-traffic pass. The Electro-Matic apparatus consists of three main parts—devices which are sensitive to the presence of the passage of a vehicle, a control mechanism, and a standard traffic light of any type. The vehicle sensitive devices are pressure-operated. They are placed back approximately 80 feet from the intersection. These record the presence of traffic, its volume and its movement toward the intersection. The cars do not stop at these devices nor are the drivers aware of their presence. They serve merely to receive the indication of the presence and movement of the car, and they transmit this indication to the control mechanism.

The control mechanism is aware of all traffic which is moving toward the intersection. It operates any standard type of traffic light so as to give the right-of-way in an efficient manner, allowing the greatest possible number of cars to pass through the intersection per hour with maximum safety and minimum confusion. The periods of the light, the system of operation and even the sequences and the phases of the signals are all self-varying depending entirely upon the changes in volume and flow of the traffic.

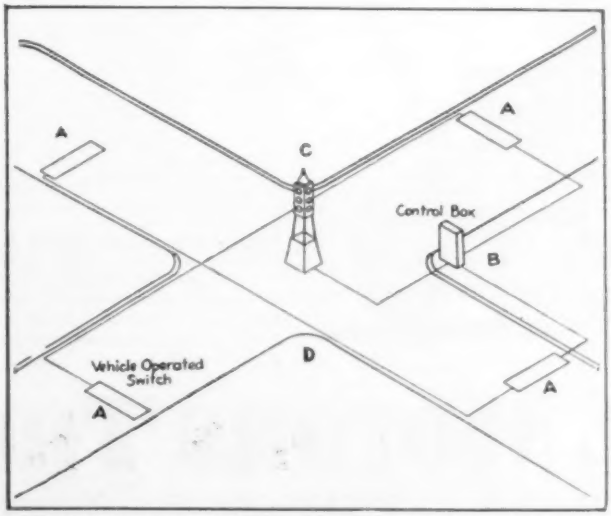


DIAGRAM SHOWING METHOD OF CONTROL BY ELECTRO-MATIC TRAFFIC-CONTROL SYSTEM

"A" is the traffic plate in the roadway operated by a vehicle, "B" is the control box or the brains of the system and "C," the traffic light proper

New Traffic Line Marker a Labor Saver

A traffic line pavement marker which has no spray nozzles, pumps, or valves and hose, has been placed on the market by the Newaygo Engineering Co., Newaygo, Mich. The paint in the Newaygo line marker is held by vacuum at a fixed level in the reservoir in front of the paint tank. From here the paint is picked up by an idler wheel, which dips into it and spreads it on the marking wheel. The marking wheel, in turn, rolls the paint on the street surface.

THE NEWAYGO TRAFFIC-LINE MARKER

The amount of paint carried onto the marker wheel is governed by a thumb-nut that applies pressure on the idler wheel, causing a wringing action that squeezes off the excess paint, which flows back into the reservoir.

The marker wheel is made of cast iron and is about 4 inches wide. Heavy wool felt is applied around the wheel, and over it a heavy rubber band is stretched. The felt cushion is thus protected so that the paint cannot get into it. Hence, the cushion does not fill up with paint pigment or harden and lose its cushion effect. Over the outside of the rubber band is laced a heavy felt cloth, which takes the paint from the idler wheel and delivers it onto the street surface. The cloth is easily replaced when worn by abrasion with the pavement.

The manufacturers state that the Newaygo line marker can be taken apart for cleaning purposes in 5 minutes and that it can be put together again as quickly. One man can lift it in and out of a car as the shipping weight, crated, is only 100 pounds. The handles are of wood and can be raised or lowered to meet the convenience of the operator. The paint tank has a capacity of from 4 to 5 gallons of standard traffic paint.

Your "3 reasons"

certainly do *interest us Mr. Keeshin!*

"... past 15 years ... used practically every make of truck ... these Buick-powered models *are by far the most economical we have ever operated* ... every truck *must* show a profit."

"Our first Buick-powered job is still in wonderful shape after eating up about 250 miles daily in heavy duty haulage for more than two years ... don't need to touch valves under 35,000 miles."

"We've got a reputation for delivering absolutely on schedule in cross country haulage ... for concerns like Atlantic and Pacific Tea Company ... when these trucks are on the highway they are never more than about 20 to 30 minutes away from parts and service, if needed."

KEESHIN MOTOR EXPRESS CO.
INCORPORATED
CARTAGE CONTRACTORS
510-512 W. HARRISON ST.
CHICAGO, ILL.

General Motors Truck Company,
Pontiac,
Michigan.

Gentlemen: May 8, 1929

The three reasons why we are standardizing on General Motors Trucks - with 21 of your Buick-powered models in our service - may interest you; perhaps other truck users, too. They are; operating economy; long life; nation wide service.

During the past 15 years we've used practically every make of truck: our records show that these Buick-powered models are by far the most economical we have ever operated.

That's mighty important to us because our profit is the difference between what we get for our merchandise-hauling and our cost in rendering the service. Every truck must show a profit.

Our first Buick-powered job is still in wonderful shape, after eating up about 250 miles daily in heavy duty haulage for more than two years.

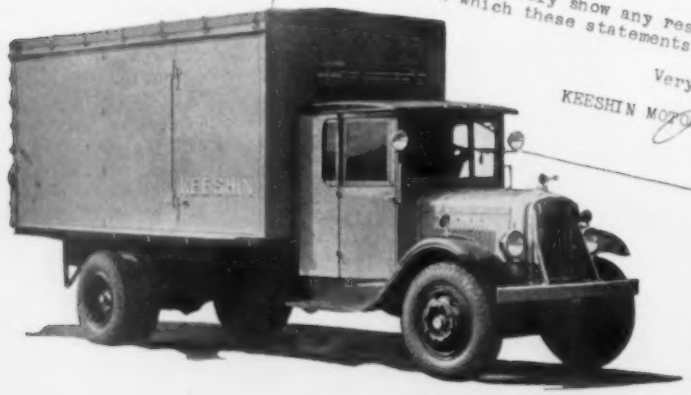
Our experience with these trucks has been that we don't need to touch the valves under 35,000 miles; that at that mileage it's seldom necessary to put in new piston rings; that we'll average 7½ miles per gallon of gas in heavy duty; that after we drain and refill not a drop of oil need be added for 900 miles.

Servicing is a big factor with us. Remember we've got a reputation for delivering absolutely on schedule in cross-country haulage of merchandise - food stuffs for example, for concerns like the Atlantic & Pacific Tea Company, Sawyer Biscuit Company, etc. When these trucks are on the highway, they are never more than about 20 to 30 minutes away from parts and service, if needed, and can be that way within an hour.

We find, in addition to splendid cooperation from your own stations, a real spirit of service in the Buick Service stations, with competent mechanics and ample stocks of engine parts. This universal service wipes out a big hazard in cross-country haulage.

We'll gladly show any responsible truck user the detailed figures on which these statements are based.

Very truly yours,
KEESHIN MOTOR EXPRESS COMPANY



Here is one of the famed KEESHIN fleet of money makers. This GENERAL MOTORS TRUCK operates from Chicago to Freeport, Ill., and back again *the same day*, with an 8000 pound payload each way. One driver and his helper handle the truck on this 250-mile journey.

GENERAL MOTORS TRUCKS

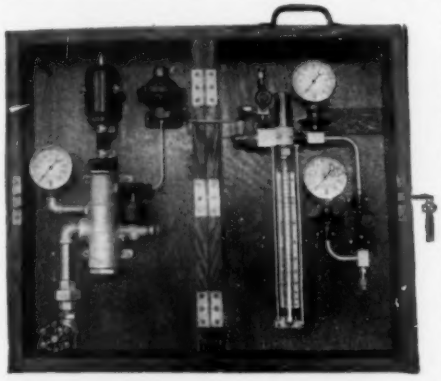
GENERAL MOTORS TRUCK COMPANY, Pontiac, Michigan

Factory Branches, Distributors, and Dealers, in 1500 principal cities and towns

ALWAYS INVESTIGATE WHAT GENERAL MOTORS HAS BEFORE YOU BUY

A Portable Chlorinator for Sterilizing New Water-Mains

A compact chlorinator in two wooden cabinets, each with a carrying handle, has been developed by Wallace & Tiernan Co., Inc., Newark, N. J., as portable equipment for sterilizing water-mains and for other emergency uses. This water-main sterilizer is complete in all fittings and accessories needed to chlorinate by either the direct or the solution method and for making the necessary residual chlorine tests for control purposes.



CASE WITH CHLORINATOR

CASE WITH CHLORINATOR ACCESSORIES AND TESTING EQUIPMENT

One cabinet contains the chlorinator, and the other the accessories and testing equipment, such as hose, flexible tubing, silver diffuser, chemical and testing bottles. This equipment has been developed to meet a growing demand on the part of water-work officials for a portable chlorinator that could be used in the field for sterilizing new and repaired sections of water-mains.

Research in the last few years has indicated that, by periodic chlorination of water-mains, after growths and biological growths and deposits in the distribution system may be entirely eliminated. The equipment described above is adaptable for operation under emergency conditions and is accordingly a worth-while supplementary chlorinator for water-works plants.

Eagle Signal Sales Corporation

The Eagle Signal Sales Corporation has just been organized with headquarters at Moline, Ill., to sell the products of the Harrington-Seaberg Division of The Gamewell Co., which include mainly traffic signal apparatus and electric sign flashers.

Special Train to Toronto Water Works Convention

An illustrated folder containing complete information regarding the special train which has been arranged via the Lehigh Valley and Canadian National Railways from New York and intermediate points for the benefit of those who are going from the East to the American Water Works Association's Forty-Ninth Annual Convention at Toronto, Ont., June 24-29, may be secured from John S. Warde, Chairman, Transportation Committee, Water Works Manufacturers Association, Room 1365, 50 Church Street, New York. Reservations should be made at the earliest opportunity.

The folder also contains a list of interesting optional post-convention trips which take advantage of the summer tourist rates in effect at the time of the convention. Most of these post-convention trips permit a stop-over at Toronto. The Transportation Committee consists of John S. Warde, Chairman, Rensselaer Valve Co., New York; Charles H. Becker, R. D. Wood Co., 400 Chestnut Street, Philadelphia, Pa.; C. R. Knowles, Superintendent Water Service, Illinois Central System, Chicago, Ill.; George M. Keefer, Rensselaer Valve Co., Oliver Building, Pittsburgh, Pa.; and William C. Sherwood, Hersey Meter Co., South Boston, Mass. Members wishing information regarding the special train and other transportation arrangements should apply to the committeeman nearest to them.

A Compressed Asbestos-Cement Water Pipe

The latest advance in the technique of water-supply in America is the development of a seamless pipe of asbestos fiber and portland cement for which is claimed immunity to practically every form of corrosion. The three chief enemies of common metal forms of water pipe are tuberculation, which gradually closes off the flow, electrolysis, or the pitting of the exterior walls at the departure points of stray electric currents, and oxidation or soil corrosion. The first is due to the chemical conditions of the water inside the pipes, while the second and third are external causes.

Asbestos or Transite pipe, as the new pipe has been named, is non-metallic and immune to tuberculation. Installations in Europe since 1916 definitely show that no reduction in area or carrying capacity has taken place. Since it is a non-conductor, it cannot carry an electric current and therefore is not subject to electrolysis. No evidence has been presented so far of any soil corrosion or oxidation of the pipe.

Transite pipe is made under heavy pressure by a patented process which allows great accuracy in thickness and weight so that only a slight variation in any given class results. The pipe is made in four pressure classes, as A, B, C, and D for hydrostatic working pressures of from 40 to 225 pounds per square inch, corresponding roughly to the standard classifications for cast iron pipe. There is also a fifth class, known as Class S, used for underground drains and for downspouts and vents. Since it is unaffected by ordinary stack temperatures, Class S pipe is used widely also for vents and flues to remove combustion gases from house boilers and water heaters. All classes of pipe are available in standard sizes from 2 inches inside diameter to 40 inches. Pressure classes of pipe under 4 inches in diameter are furnished at present in 10-foot lengths, 4 inches and over in 13-foot lengths. All sizes of Class S pipe are supplied in lengths of 10 feet. The joints used in foreign installations are chiefly of two types: the Simplex, consisting of a Transite sleeve pulled on over two Para rubber rings; and the Gibault, consisting of a middle ring of cast iron or steel, two rubber gaskets and two flanges of the same material as the middle ring drawn tight against the gaskets by bolts. It is similar in appearance to an American Dresser coupling. For water service in America, a joint has been specially designed by the Lock Joint Pipe Co., Ampere, N. J., incorporating the compressible lead gaskets used in their own reinforced concrete pipe. For gas, a joint of the Dresser or Dayton type is used. Class S light-weight soil and vent pipe is made with bell-and-spigot ends and many standard and special fittings are available.

Transite pipe weighs from 50 to 60 per cent less than iron pipe of equal size and for equal pressures. It has about 14 per cent higher delivery capacity, according to the manufacturers, than new and clean cast iron and retains this capacity permanently. The walls are somewhat thicker than those of metal pipes and, since the material is a poor conductor of heat, the line can be laid with less cover. This pipe can be cut, turned, drilled, threaded and tapped in about the same manner as a very hard wood. Field cuts and service connections can be made quickly, accurately and tight.

The United States and Canadian manufacturing and sales rights for this pipe have been acquired recently from the Eternite Pietra Artificiale, S. A., patentees, Genoa, Italy, by the Johns-Manville Corp., New York City, which has just announced that two large units capable of producing 2,000,000 feet per year will be placed in production during the summer at their Waukegan, Ill., plant.

McVea Opens Consulting Office

J. C. McVea, who resigned the office of City Engineer of Houston, Texas, has opened up an office for the practice of consulting engineering in the municipal field, especially city planning and subdivision work, at 1512 Esperson Building, Houston, Texas. Mr. McVea is well known for his work in Houston in developing extensive municipal improvements. He is a member of the Am. Soc. C. E., Am. Soc. M. I., and Am. W. W. Assoc.

NYE ODORLESS GARBAGE INCINERATORS
Are Considered Best
Because

Econnmical to Operate — No Commercial Fuel Required
No Skilled Labor Required — No Separation of Refuse
Consumes Wet Garbage in Large Quantities
Absolutely no Obnoxious Odors

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NEW YORK & MACON
MAIN OFFICE & FACTORY: MACON, GEORGIA

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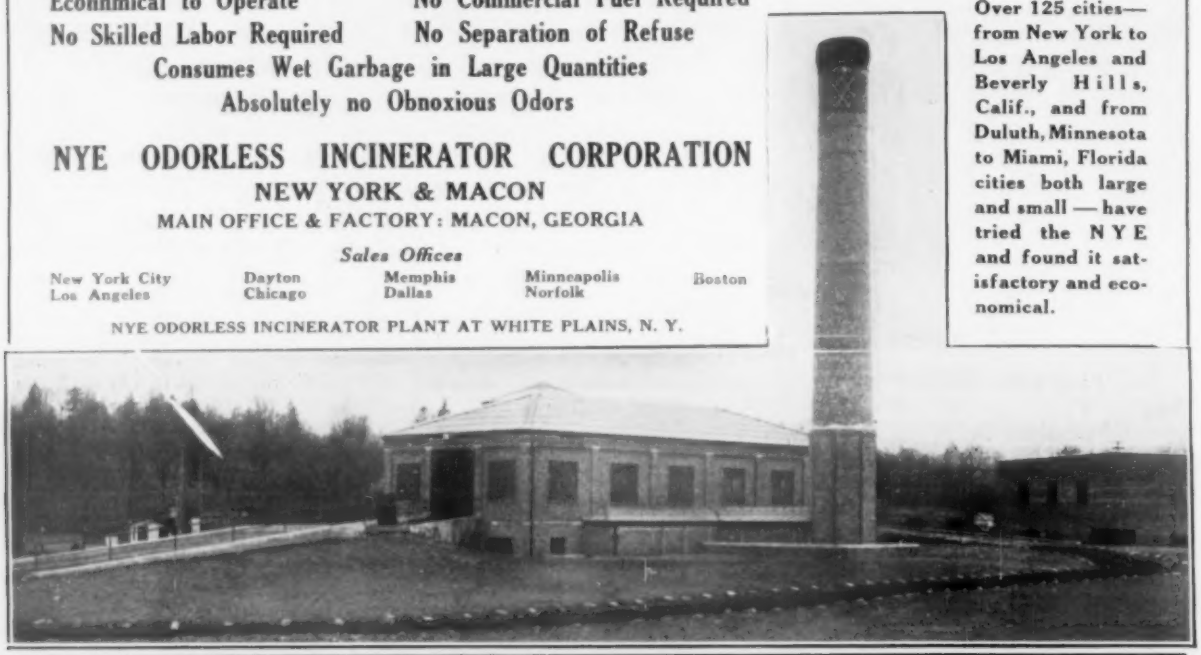
New York City, Los Angeles, Dayton, Chicago, Memphis, Dallas, Minneapolis, Norfolk, Boston

NYE ODORLESS INCINERATOR PLANT AT WHITE PLAINS, N. Y.



Over 125 cities—from New York to Los Angeles and Beverly Hills, Calif., and from Duluth, Minnesota to Miami, Florida cities both large and small — have tried the NYE and found it satisfactory and economical.

Hand Machine

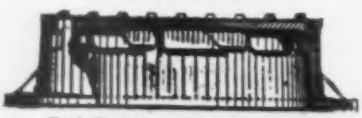
To the City Manager or City Engineer:

You can machine manhole castings for less than a dollar each with our Grinding Machine. With our Hand Milling outfit you can machine standard 24-inch manhole in street in a half-hour. For particulars write

C. H. LYNE FOUNDRY & MACHINE CO.
P. O. BOX 4218, STATION "A" MIAMI, FLA.

Power Machine

Pat. No. 965163



D. & D. Safety and Noiseless Cover

WM. E. DEE COMPANY
80 N. La Salle Street **Chicago, Ill.**

We manufacture Manhole, Catch Basin and Sewerage Castings of all kinds.
We make anything in Gray Iron. *Write for our prices.*

For Perfect Pipe Joints use —

HYDRO-TITE
Reg. U. S. Pat. Off.

Stronger — Tighter — More Flexible—Self-caulking. Saves 75 per cent in material and labor. Write for literature.

HYDRAULIC DEVELOPMENT CO.
50 Church St., New York, N. Y.
BOSTON CHICAGO

MURDOCK

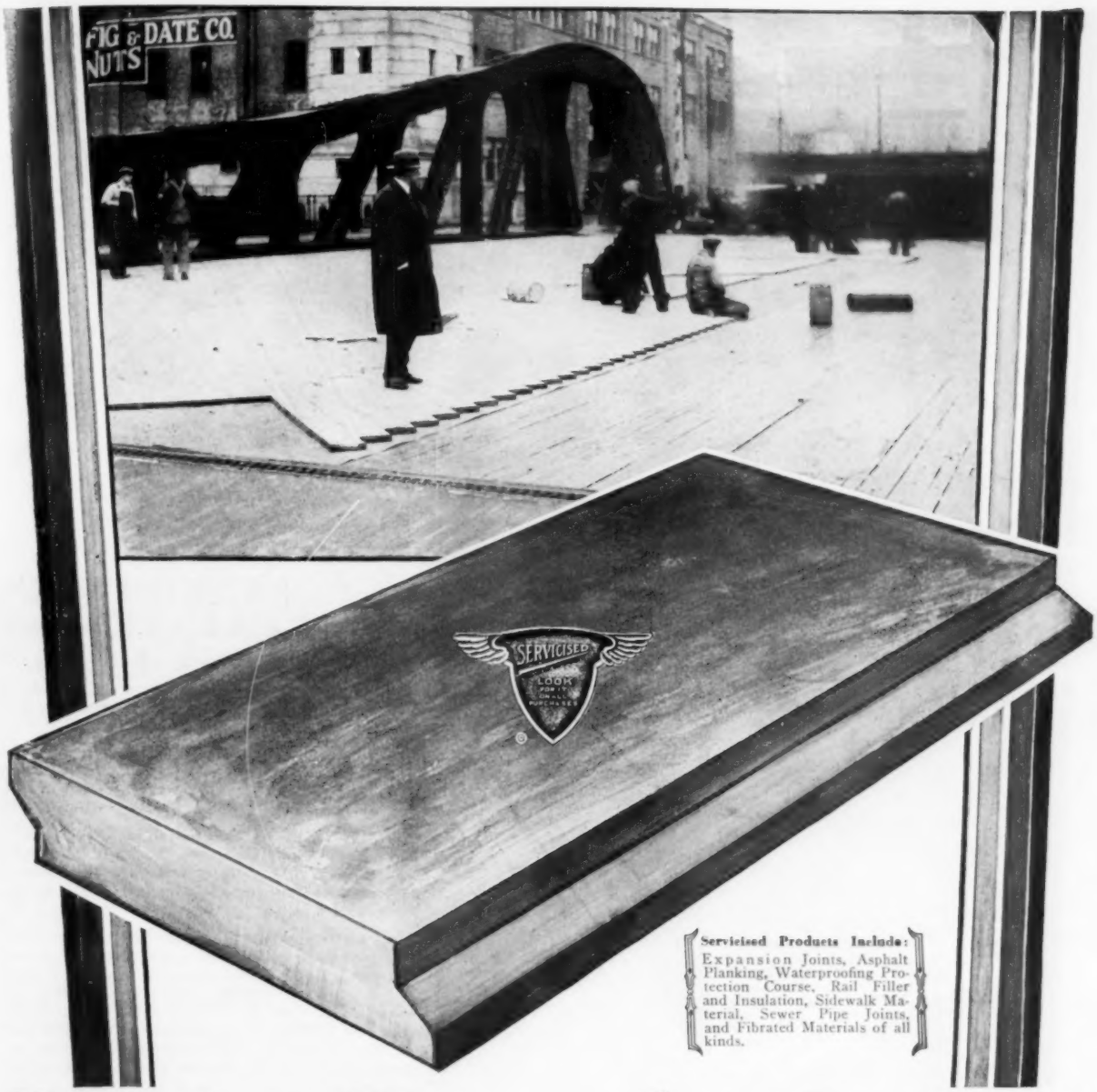
593
CITIES AND TOWNS
have installed Murdock Outdoor Bubble Fonts in schoolyards, playgrounds and parks in the past seven years.

DO NOT FREEZE. Operate satisfactorily winter and summer. Inner works entirely of brass and removable without digging up. Bowl and bubbler head solid bronze, chromium plated—everlasting bright finish. Either vertical bubble or angle stream.

Write for Booklet, "A REMARKABLE OUTDOOR DRINKING FOUNTAIN."

Other Murdock specialties—Anti-freezing Hydrants, Street Washers, Lawn Hose Boxes, Drinking Fountains, etc., and described in our Catalog No. 106.

THE MURDOCK MANUFACTURING & SUPPLY CO.
426 PLUM ST., CINCINNATI, OHIO
Since 1853



Servicised Products Include: Expansion Joints, Asphalt Planking, Waterproofing Protection Course, Rail Filler and Insulation, Sidewalk Material, Sewer Pipe Joints, and Fibrated Materials of all kinds.

Bridge Floors that Endure!

Servicised Asphalt Plank is an improved wearing surface for bridges, viaducts, approaches, sidewalks and all traffic bearing structures.

Servicised processes combine uniformly a base of specially refined asphalt with several types of selected fibrous materials and mineral particles, to give the finished plank all the qualities that experience has shown to be necessary to meet the hammering of today's traffic.

The qualities which Engineers stress and which are built into Servicised Asphalt Plank are:

Durability—Long wear, will not splinter, crack or shatter. **Strength**—Bears traffic easily. **Vibration Proof** and decreases noise. **Not Slippery** when wet. ***Ruggedness***—Not affected by decay, usual acids or moisture. **Resiliency**—Extremes of temperature do not affect it. **Self-Healing** under traffic. **Waterproof**—Preserves integrity of waterproofing course. **Easily Laid**—Can be laid over any suitable substructure, in any climate, at any time of year, without special labor. **Initial Cost** is moderate, maintenance is negligible—appearance is superior.

Servicised Waterproof Protection Course consists of premolded fibrated bituminous slabs, usually one inch thick, applied upon the waterproofing membrane and forming a tough and enduring protection which accommodates itself to movements of the structure and makes an elastic waterproof bedding for the overlying wearing surface. In characteristics and composition it is similar to Asphalt Planking.

Write Servicised Engineers for specifications and methods of application.

SERVICISED

Servicised Products Corp.

Factory: 6051 W. 65th St., Chicago, Ill.

Gen'l Office: 53 W. Jackson Blvd., Chicago, Ill.

Do you mention THE AMERICAN CITY when writing? Please do.

HUSKINESS IN GEAR-TRAINS MEANS LONG-LIFE METERS!

THE illustration shows a phantom view through the outside casing to the famous Federal Meter Gear-Train!

Officials in the waterworks field know this to be the huskiest, strongest, heaviest gear-train to be found in any water meter on the market in the usual sizes for house uses, namely, ⅝ in., ¾ in. and 1 in.

And, when you stop to think that the average meter must turn 300 times in order to measure one cubic foot of water flowing through it, and also that the average house-consumption of water in a year is 10,000 cubic feet, which calls for 3,000,000 revolutions of the disc and the first pinion on the gear-train, then the importance of huskiness in these parts seems very real.

Federal gears have 20 per cent more wearing surface than the usual or standard gears in water meters. No other make of gear train is as heavy.

The A. P. Smith Mfg. Co. has owned and controlled the Federal Meter for some time. Only recently, it took it over under its own name as a regular part of the Smith Line of Waterworks Specialties and Supplies. No change in personnel or methods of manufacture.

Mail the Coupon!

Our New Catalogue (Nearly 250 Pages) Soon Ready.

THE A. P. SMITH MFG. CO.,
East Orange, N. J.

We are interested to know more about the Federal Meter. Please furnish full information.

Name.....

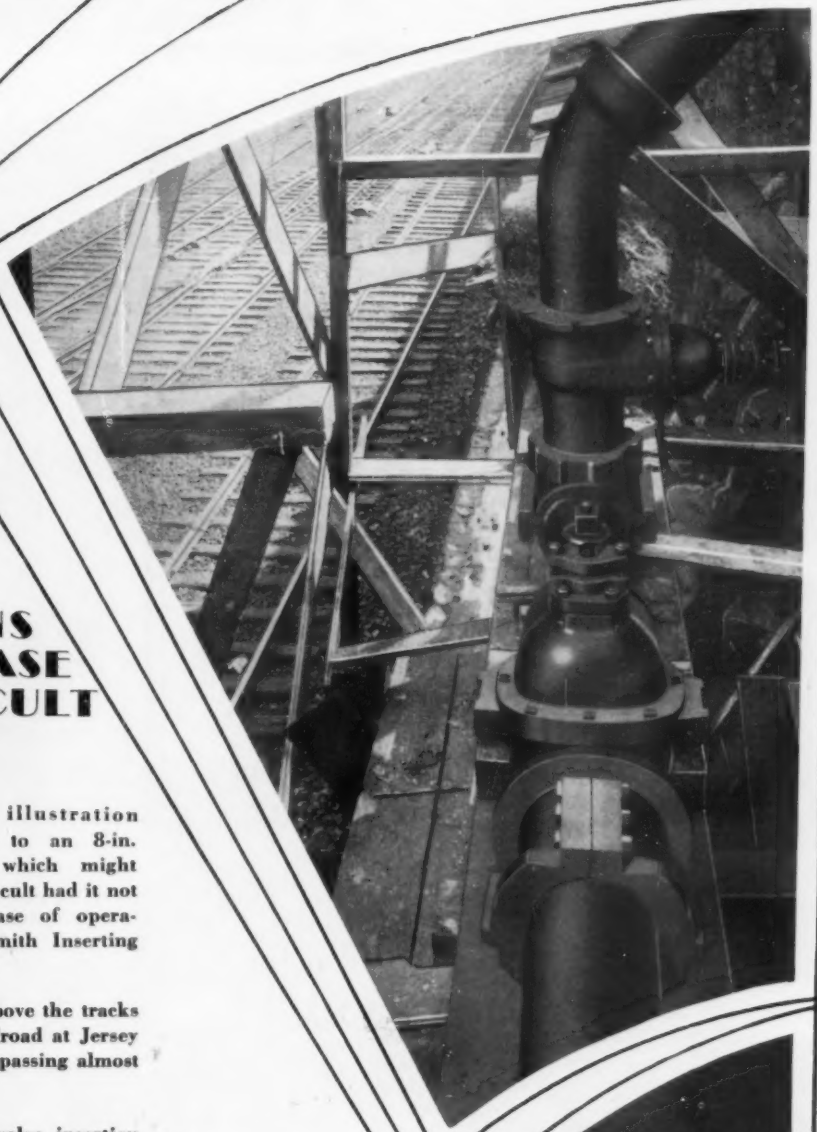
Connection.....

Address.....

SMITH

FEDERAL
WATER METERS

THE A.P.SMITH MFG.CO. *East Orange.N.J*



CONNECTIONS MADE WITH EASE UNDER DIFFICULT CONDITIONS!

THE illustration shows two connections made to an 8-in. iron pipe under conditions which might easily have proved extremely difficult had it not been for the efficiency and ease of operation of Smith Tapping and Smith Inserting Machines.

The pipe was situated 22 feet above the tracks in the open cut of the Erie Railroad at Jersey City, N. J., where fast trains are passing almost every minute.

In the foreground is an 8-in. valve insertion made with the Smith Inserting Machine and using a Smith Inserting Valve with the Smith Inserting Sleeve calked against it.

And in the background is a Smith Tapping Valve connected to the same pipe by means of a Smith Tapping Sleeve (Hackensack Type).

There was no need to turn off the pressure for either operation!

Our New Catalogue (Nearly 250 Pages) Soon Ready.

Mail the Coupon!

SMITH
WATER WORKS SPECIALTIES & SUPPLIES
THE A.P.SMITH MFG.CO. *East Orange,N.J*

THE A. P. SMITH MFG. CO.,
East Orange, N. J.

Please furnish us full information about Tapping and Valve-Inserting Machine and Supplies.

Name.....

Connection.....

Address.....

This is

TORONTO'S CITY HALL

You'll see it on your visit to Toronto for the Convention of the American Water Works Association.

The Pitometer representatives who will attend this meeting will be glad to see you at the Royal York Hotel and show you how your Water Department can cut its costs by means of a Pitometer Survey.

New Pitometer Services

The Trunk Main Survey

consists of a measurement of the flow at the critical points in a trunk main system of a city, in order to determine those mains which are over taxed and those which are not doing the work for which they were designed, with recommendation for the proper construction to obtain maximum service at minimum cost. Also, a measurement of the loss of head and the determination of coefficient "c" in Williams and Hazen's formula.

The Water Distribution Survey

is a study of the existing distribution system of a municipal plant, in order to determine the extensions and replacements necessary to meet the present needs and future requirements for a twenty-five year period. The purpose is to enlarge the distribution system in the most efficient and economical way to keep pace with the growth of the city.

These two services are described in Bulletin 16; also write for Bulletin 11 describing our Water Waste Surveys.

The PITOMETER CO.

Water Distribution Engineers

52 CHURCH ST. NEW YORK

During June we hope you will remember to mention THE AMERICAN CITY

NO. 5

WATCH FOR NO. 6

INSIDE INFORMATION

The Three Part Disc

ANOTHER feature of Arctic and Tropic Meters is the three part hard rubber disc. It is so constructed that the individual parts may be replaced without the expense of renewing the entire disc.

It is also possible, in event of wear on the balls or in the ball seats, to take out the "play" by simply reversing the half balls or by shimming them with thin layers of suitable material.

This three part construction also permits a more thorough vulcanization of the rubber than is possible in a solid one piece disc.

PITTSBURGH EQUITABLE METER COMPANY

MAIN OFFICE AND WORKS PITTSBURGH, PA.

1433 MAIN ST. COLUMBIA, S.C.	525-16th AVE. NORTH SEATTLE, WASH	BRANCH OFFICES	331 RIO GRANDE AVE. SALT LAKE CITY, UTAH	MUTUAL BLDG. KANSAS CITY, MO.
REPUBLIC BANK BLDG. DALLAS, TEXAS	50 CHURCH ST. NEW YORK, N.Y.	UNION BANK BLDG. LOS ANGELES, CALIF.	KENNEDY BLDG. TULSA, OKLA.	PEOPLES GAS BLDG. CHICAGO, ILL.

Before Union brought out the new King F. P. Meter, meter manufacturers thought the thrust roller could be placed only at the weakest point.

Union puts it at the strongest.

Uniform strength attained in meter construction by the pioneer manufacturers in the industry.

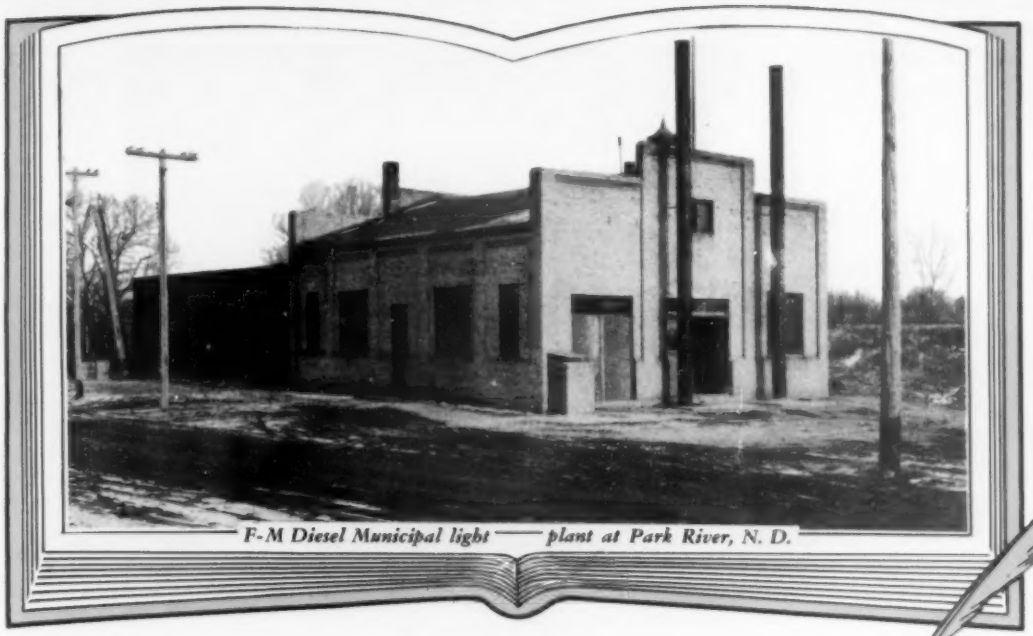
Thrust roller location now the strongest part.
Perfect balance through new roller position.
Eccentric lock yield to extreme pressure.
Chamber cannot become bound.
Friction thrust reduced.
Perfect insulation.
No corrosion.

An outstanding achievement in water meter construction that has won recognition by water works experts throughout the country.

UNION WATER METER CO., Worcester, Mass.
New York: 50 Church St. **Philadelphia: 411 Bulletin Bldg.**

UNION

Water Meters - Easy Turning Stops - Chronometer Valves
Presses for Lining Paper - Pressure Regulators - Alarm Signals



F-M Diesel Municipal light plant at Park River, N. D.

Savings . . .

The books of Park River, N. D., tell a story of savings made by F-M Diesel Engines that will go down in municipal light plant history.

In 1922 this city was struggling under a burden of losses from their steam plant. Operating expenses exceeded the income in spite of the high rate of 22 cents per kilowatt hour.

On recommendation of Fairbanks-Morse Engineers the council replaced this plant with 100 hp. and 25 hp. F-M Diesel Engines and the following year a third F-M Diesel of 50 hp. was added.

The record of this plant is written in savings from the start. In six years these F-M Engines have paid for themselves, bought a white way lighting system at a cost of $10,300 and built up a surplus of $16,991.51 in the treasury—and *rates have been steadily reduced* to the present rate of 12½ cents per kilowatt hour.

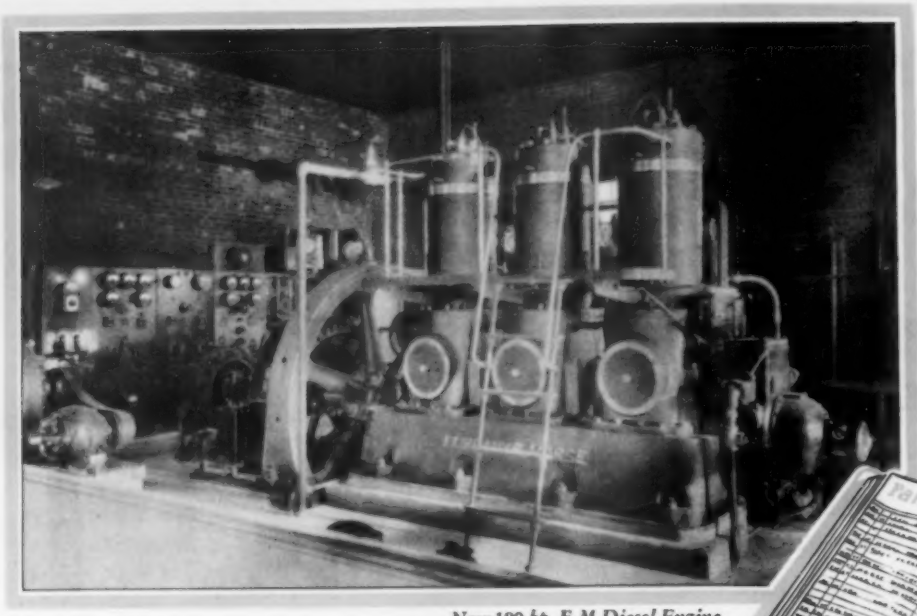
POWER, PUMPING AND WEIGHING EQUIPMENT

FAIRBANKS-MORSE

DIESEL ENGINES

FAIRBANKS-MORSE DIESEL ENGINES

FAIRBANKS-MORSE *DIESEL ENGINES*



New 180 hp. F-M Diesel Engine installation in Park River, N. D., municipal light plant.

. . . and Now

Park River adds a *Fourth* F-M Diesel to their light plant

As a result of the high economy of the F-M Diesel Plant at Park River, N. D., and consequent reduction in rates from 22 cents to 12½ cents per kilowatt hour, the load rapidly increased until it threatened the capacity of all three F-M engines to take care of the peak.

These engines had given positive service and built up profits for more than five years. On this fine record a new 180 hp. F-M Diesel was bought and installed last fall.

The new engine permits holding one unit in reserve and insures the same continuous service and high earnings on the increasing current demands.

Fairbanks-Morse Research and Development have perfected a Diesel of high over-all economy that is setting new low power costs within the field of Diesel power itself. Write for full information.

FAIRBANKS, MORSE & CO.
900 S. Wabash Ave., Chicago
32 branches at your service throughout the United States

FAIRBANKS-MORSE

DIESEL ENGINES

CONTROLLED TRAFFIC

Smooth Flowing . . . *Fast* or S-l-o-w . . . as you desire . . . when directed by the HARRINGTON-SEABERG CO-ORDIPLEX Traffic Control System

Traffic Signals

The Traffic Signals shown on this page are the Harrington-Seaberg Four-Way Pedestal Signals. There is a Harrington-Seaberg signal to meet the requirements of every traffic condition.

The pride you have in your city is undoubtedly justified. Rapid growth; commercial and industrial progress; beautiful homes; cleanliness—perhaps all of these. BUT—what about your method of controlling traffic? Is it obsolete—cumbersome—haphazard—costly?

Consider for a moment the Harrington-Seaberg Co-Ordiplex Traffic Control System. With mechanical precision and dependability it regulates the movement of traffic—*fast* or s-l-o-w, as you desire. Annoying tie-ups and congestion at busy intersections are eliminated. Traffic flows smoothly, without confusion or delay. Indeed, your traffic problem becomes no problem at all.

And how flexible the Co-Ordiplex Control System is! Whether the population of your city is 25,000 or a million it fits your requirements admirably. The local timer serves individual lights at heavy traffic points—then as growth or necessity demands it any group of lights may be placed under the centralized control of a master timer. Thus are met your present and future requirements.

Small wonder that Chicago, East Cleveland, Baltimore, Rochester and many other cities, large and small, have installed the Harrington-Seaberg Co-Ordiplex Traffic Control System. For this efficient, flexible system—easily installed and easily regulated—has thoroughly demonstrated its ability to solve, once and for all, the traffic problem of cities—*your city.*

The experience of Harrington-Seaberg engineers is placed at the disposal of your community. Write today for literature describing in detail the Harrington-Seaberg Co-Ordiplex Traffic Control System.

Eagle Signal Sales Corporation

Subsidiary of Gamewell Co.

Distributors of

HARRINGTON-SEABERG PRODUCTS

MOLINE, ILLINOIS

-and now

Introducing The New PARADON!

Chlorinating Scale

It is standard practice to use a platform scales with a chlorinating installation.

The PARADON CHLORINATING SCALES combines the standard PARADON Chlorinator with platform scales. The Platform Scales is actually part of the chlorinator.

You are assured a neat and attractive installation. Much space is saved. The platform scales cannot be removed for other uses.

The PARADON CHLORINATING SCALES is available with any type PARADON Chlorinator (direct feed or solution feed) except the Thermo Type TSM.

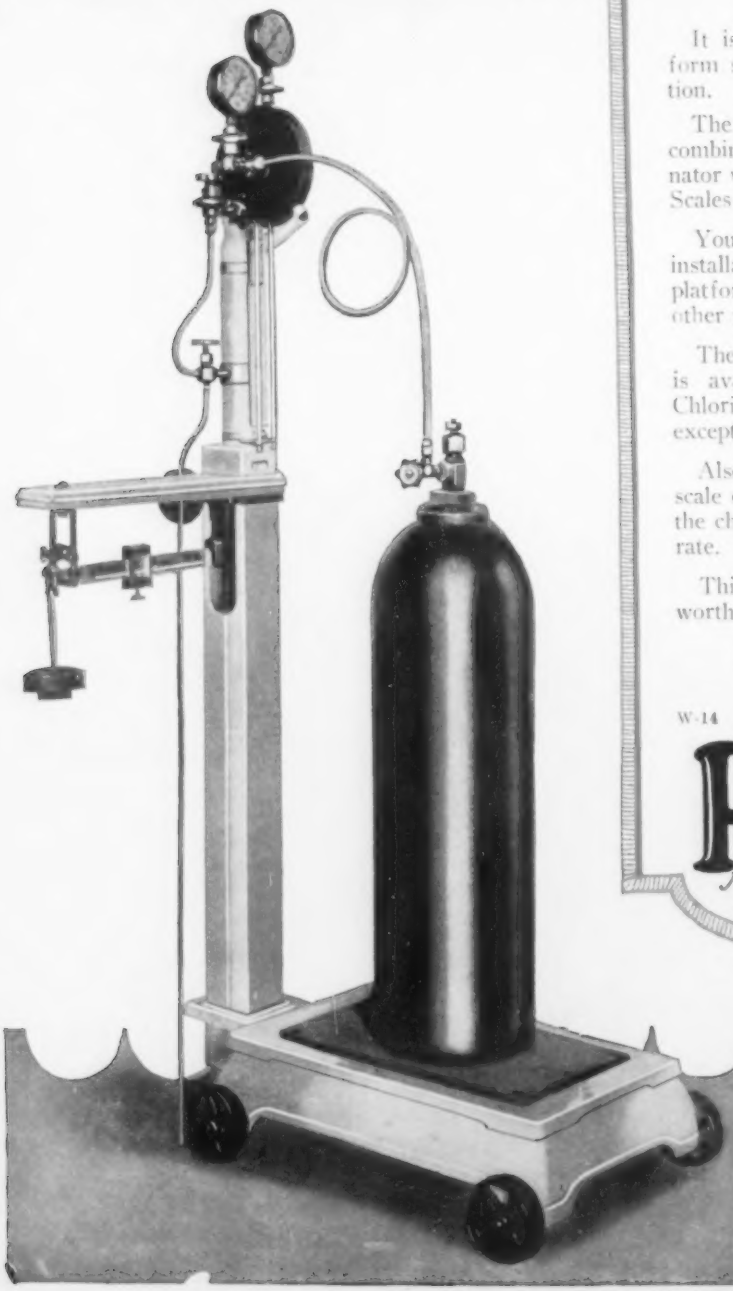
Also, very important,—the chlorinating scale does not cost you a cent more than the chlorinator and platform scales separate.

This is an exclusive PARADON feature worth investigating.

Send for our Bulletin M-10

PARADON MFG. CO.
W-14 **Arlington, N. J.**

Paradon CHLORINATORS
for—
City and Private Water and Sewage Systems, Industrial Plants and Swimming Pools



A Hydrant Problem Solved—

"Bill, here's a problem:—The Fire Chief insists all those old two nozzle hydrants in the downtown area be replaced immediately with new ones having steamer nozzles—and Bill he's right—but our appropriation is nearly exhausted."

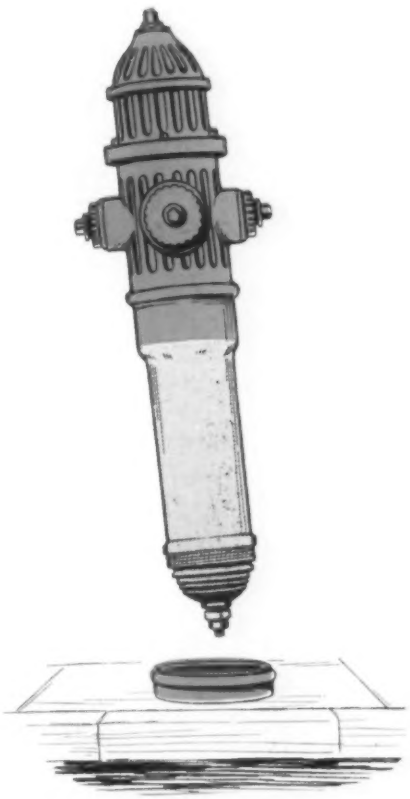
"That's easy, Commissioner.—We have enough money for new hydrant barrels with steamer nozzles."

"Yes, Bill, but those downtown hydrants are set in paved sidewalks, and it will cost a fortune to dig them up and replace all that paving."

"That's true of most hydrants, Commissioner—but fortunately these are MATHEWS—and the entire barrel can quickly be replaced without breaking the paving.—And then I can save the old barrels for those suburban extensions. We'll have plenty of money, and I'll have the whole job finished in short order."

"Go to it, Bill!—A good thing we used MATHEWS! Don't ever change!"

Send for a complete description.



The whole "works" out in a "jiffy"

MATHEWS FIRE HYDRANTS

REG. U. S. PAT. OFF.

Manufactured by

R. D. WOOD & CO.

Established 1803

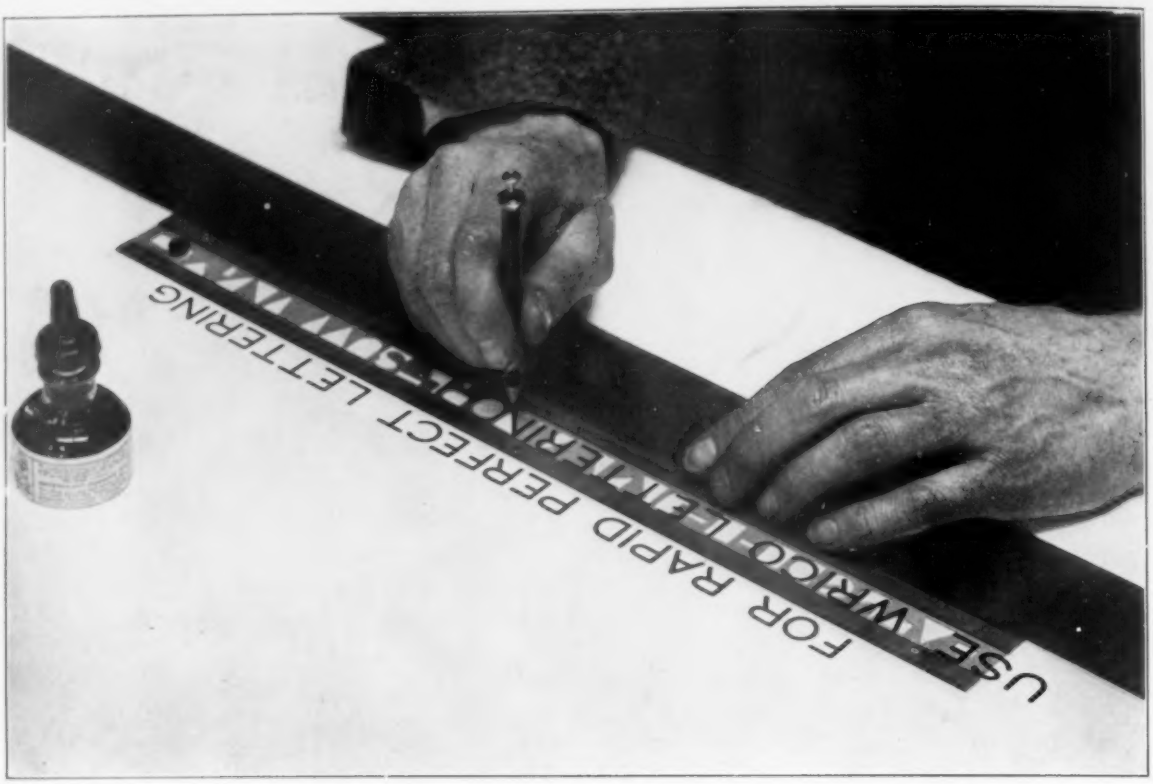
PHILADELPHIA

CAST IRON PIPE AND FITTINGS

SAND SPUN (centrifugally cast) and PIT CAST

REG. U. S. PAT. OFF.

Gate Valves **Valve Boxes** **Indicator Posts** **Floor Stands** **Hydraulic Valves** **Hydraulic Tools** **Gas Producers**



WRICO

LETTERING GUIDES

INTRODUCED—SIX YEARS AGO
TODAY—THE RECOGNIZED STANDARD

WRICO LETTERING GUIDES ARE BEING USED IN THE DRAFTING ROOMS OF THE MAJORITY OF ENGINEERING AND INDUSTRIAL CONCERNS — ALSO BY MORE THAN FIVE THOUSAND CITY DEPARTMENTS

THE WOOD-REGAN INSTRUMENT CO., INC.
2-4 LACKAWANNA PLACE
SOUTH ORANGE, N. J.

Gentlemen: Please send me a copy of your illustrated catalog and price list containing full description of WRICO LETTERING GUIDES and PENS together with complete samples of lettering.

Name.....

Street.....

City and State.....

THE WOOD-REGAN INSTRUMENT CO., INC.
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NEW YORK CITY

AUSTRALIA
J. CREFFIELD PLY., LTD.
171 KING ST., MELBOURNE

CANADA
THE HUGHES OWENS CO.
Limited
MONTREAL TORONTO WINNIPEG OTTAWA

ACCURATE LARGE METERS

6-INCH EMPIRE METER

Make Your

Big Services

Pay

Big Profits

There is one sure way of getting the best returns out of the water you serve . . . simply install the right kind of meters. The right kind of revenue will result as a matter of course.

EMPIRE OSCILLATING PISTON METERS

EMPIRES are preeminently the right kind of meters. If you are looking for reliability you don't need to shop around for it. Here it is in the EMPIRE. In the large sizes especially, the accuracy of EMPIRE meters is often described by their users as "astonishing." Even the very small flows, such as are almost entirely lost by an average meter, the big EMPIRE will catch and register unfailingly. What this means in increased income is easy to see.

There is a good reason for EMPIRE accuracy. The movement of the piston, which does the measuring, is always forward, and in the same direction as the flow of the water. This makes it easier for every bit of water that enters the measuring chamber to push the piston on its way, and so register itself, than it would be to escape past it. Only the oscillating piston design works like that.

EMPIRE ECONOMY

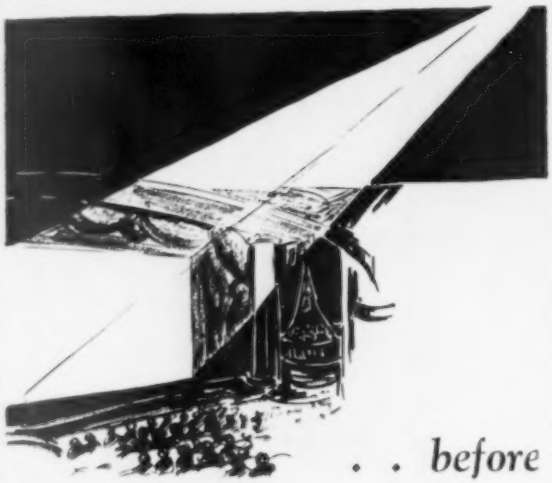
EMPIRES also hold the record for low cost of maintenance. It is nothing unusual for EMPIRE meters to be ten, fifteen, and more years in active service, without the need of a single cent's worth of repairs, and then, when taken out, to test right up to the standard for new meters.

ALL SIZES UP TO 6 INCHES

NATIONAL METER COMPANY

299 Broadway, New York

Chicago Boston Atlanta San Francisco Los Angeles San Antonio



. . *before the "Movies" were invented* NIAGARA and AMERICAN WATER METERS *were in use.*

In 1893 the Kinetoscope (this first practical moving picture projector) was invented by Thomas A. Edison.

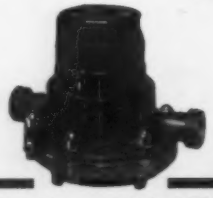
A year before this invention the Buffalo Meter Company built its first meter and by 1893 had built and installed hundreds of Niagara and American Water Meters in more than a score of cities.

Today nearly a million Niagara and American Water Meters are serving thousands of municipalities and industries in every civilized nation in the world.

Many of these, built and installed before the Kinetoscope was invented, are still in use and, because of their dependable, accurate and trouble-free service, are practically forgotten by their owners.

If you want water meter service in your municipality that is measured by the investment of a few cents per year per meter, it will pay you to get the facts on Niagara and American Water meters. Send today for your copy of the 1929 Niagara and American Water Meter Catalog!

BUFFALO METER COMPANY
2902 Main St. Buffalo, N. Y.



NIAGARA *and* **AMERICAN**
IRON CASE BRONZE CASE
Water Meters

Cast Iron Pipe

for Water and Gas

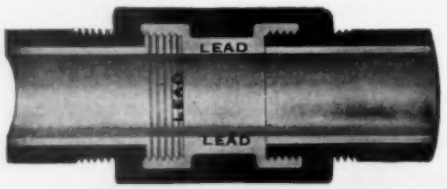
Cast Iron Pipe and Special Castings, Bell and Spigot, Flange, Flexible Joint, Culvert, Milled and Plain End Tubes, Cylinders, Flanged and Bell and Spigot Fittings, High Pressure Fire Service Pipe, Warren Short Body Specials.

Sizes 2- to 60-inch

Pipe manufactured in accordance with standard specifications adopted and approved by water works association and engineers.

Warren Foundry & Pipe Co.
Formerly
Warren Foundry and Machine Co.
Sales: **Bowling Green Building, New York City**
Offices: **201 Devonshire Street, Boston, Mass.**

This shows Pipe just entering Lead Threads of Fitting



This shows Pipe Screwed into Lead Threads and Shoulder of Fittings

For Dependable Service Installations

"Wakefield" Galvanized

Amalgamated Lead Lined Iron Pipe and Fittings

Low Cost—Easily Installed—Permanent

Inquiries respectfully solicited

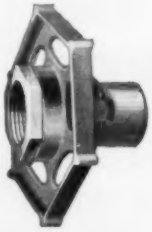
LEAD LINED IRON PIPE COMPANY
WAKEFIELD, MASS.

The FORD

STRAIGHT LINE YOKE

THE FORD Yoke is entirely *different in principle and operation* from any other meter holding device. Piping is held in *absolutely rigid alignment* and water-tight joints are made by *expansion from within* against rubber gaskets in fixed ports. In that principle, lies the *undoubted superiority* of the Ford Yoke in all of its various types. The Straight Line Yoke is especially intended for setting water meters in straight service pipes, whether in the cellar or in the meter box.

Expansion Connection



Every Ford Yoke includes the Ford Expansion Connection. This is an all bronze connection which is screwed onto the meter spud with a wrench. Meter is then dropped into the yoke between the gaskets and *turning the large hand wheel expands the connection outward* against the gaskets. Meter may be set or removed without tools even through a small, neat meter box opening.

The Angle Yoke

Here is another adaptation of the Ford Yoke and Expansion Connection principle. *Where the inlet is vertical and outlet horizontal,* this Angle Yoke should be used. It is made both plain or with stop valve as shown or with bleeder valve and may be had with or without union. All of the inherent advantages of the Ford Yoke are obtained in any style of setting.

Ask for Bulletins

WATER METER SETTING & TESTING EQUIPMENT

THE FORD METER BOX CO.

WABASH, INDIANA

12 ADVANTAGES

1. *Meter may be installed or removed from the line in a few seconds at any time.*
2. *Costs but little, if any more than meter couplings and pipe fittings it eliminates. Its cost often saved changing meter once.*
3. *Pipe is maintained in perfect spacing and alignment whether meter is in or out. Removal of meter does not move piping; no danger of causing leaks.*
4. *Meter is relieved of all piping strains.*
5. *Relieves troubles of wrong gasket space and different lengths of meters.*
6. *By making meters more readily available for removal and replacement it tends to make them better cared for, more accurate.*
7. *When meter is removed, it is difficult for customer to steal water; he cannot bridge across.*
8. *Yoke serves as a spacer, giving correct spacing and alignment. Meter may be set in a few seconds any time later. No necessity for pieces of pipe to be used as spacers and replaced with meter. Plumbing work on outlet cannot destroy spacing or alignment, or put strain on the meter.*
9. *The Expansion Connection is the only moving part of the Yoke. It is all bronze, and is removed with the meter. When the meter is out, there are no exposed threads to corrode as with ordinary couplings.*
10. *Yoke makes it easier to seal meters in line.*
11. *Permits the use of smaller and neater meter box lids.*
12. *For a few cents additional Yoke may be had with test or drain valve at outlet. Dead meters may be easily detected.*

THE JERSEY METER BOX

"Will the Jersey meter box withstand traffic shocks?"
"Yes, because its outer lid is reinforced."
"Does it fasten securely?"
"It certainly does! There's a specially designed Combination Ring Handle Lock for locking lightly and unlocking readily for lifting out the meter. Or, some models have a Screw Lifting Lock operated with a pentagonal wrench. This lock, too, is very satisfactory."
"How about frost protection?"
"All boxes are equipped with the Frost Protection Inner Lid unless otherwise ordered. We also have a warm-climate model. (See the picture at your right.)"

Water Tight—Cast Iron Sectional Valve Housings

See our advertisement in 1929 Municipal Index for particulars

May we mail you further information?

S.E.T. VALVE & HYDRANT CO.

50 CHURCH ST., NEW YORK CITY

WATER TANKS and TOWERS and MUNICIPAL CASTINGS

500,000 GALLON TANK

A tank beautiful, built for the "City Beautiful," Orlando, Florida

Water tanks and towers in standard and special designs, meter boxes and curb boxes, anti-rattle manhole rings and covers, catch-basins, cast-iron and steel white-way posts—these are a few of our products which it will pay a municipality to investigate.

Seventy-seven years ago SCHOFIELD'S built up a reputation for durable castings. Since then, year after year, our Engineers have been making improvements, until now SCHOFIELD products are carrying the story of SCHOFIELD RELIABILITY all over the world.

Shall we send you further literature?

J. S. SCHOFIELD'S SONS CO.

Founded 1852

Tampa, Fla., Office 310 Krause Bldg. MACON, GA. Atlanta, Ga., Office 1503 Candler Bldg.

(ENGINEERING ADVICE GIVEN ON REQUEST)

HEALTHY·· CITIES *are* PROSPEROUS - CITIES -

PREVENTION

City sanitation authorities well know the truth that prevention is better than a cure. These measures to head off epidemics before they get started often embrace scientifically operated sewage treatment plants.

Their general value is being conclusively demonstrated, as well as that of Liquid Chlorine for making certain of these processes more effective.

Multi-Unit Tank Car

This E B G Cylinder Valve Yoke permits of more rapid connection and disconnection of Chlorine containers to other equipment by eliminating the necessity of making threaded connections each time a new cylinder is put in service.

The facts about the use of Liquid Chlorine in killing germs contained in sewage and industrial wastes are of practical value. E B G has collected them in booklet form. Write for this literature, and include the names of your friends.

Look for the RED Cylinder

Your Water and Sewage Deserve the Best Treatment

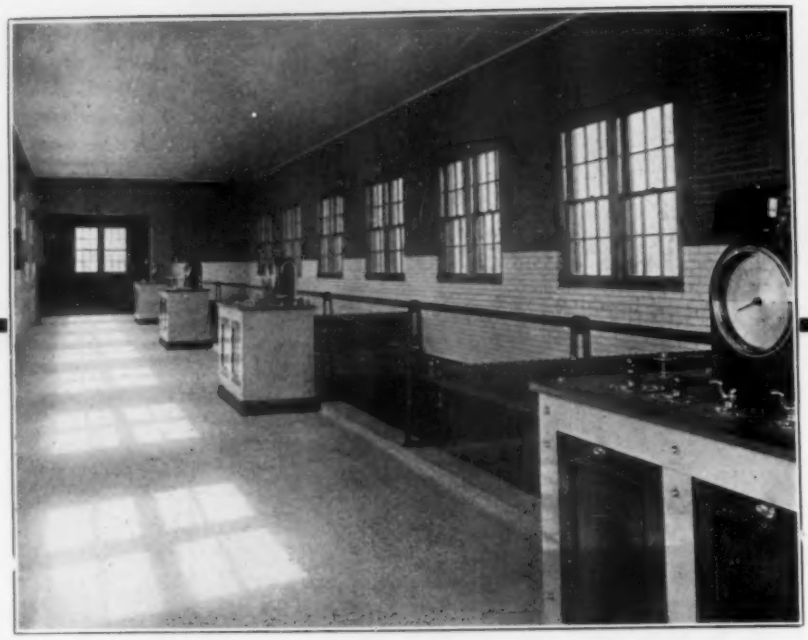
Electro Bleaching Gas Co.

PIONEER MANUFACTURERS of LIQUID CHLORINE

Plant: NIAGARA FALLS, N.Y.

Main office 9 East 41st Street New York

E B G Liquid Chlorine



THE OPERATING GALLERY
Four Million Gallon Filtration Plant
Menasha, Wis.

NORWOOD

MUNICIPAL FILTERS

Safe! Efficient! Economical!

Installations include such municipalities as Niagara Falls, N. Y.; Erie, Pa.; Toledo, Ohio; Evanston, Ill.; Dunkirk, N. Y.; Menasha, Wisc.; Meriden, Ct.; Three Rivers, Que.; Farnham, Que.; Hawkesbury, Ont.; Drummondville, Que.; Victoriaville, Que.

Take advantage of our cooperation

Write for information

NORWOOD ENGINEERING CO.

FLORENCE, MASSACHUSETTS

Canadian Office: 1584 Clarke St., Montreal, P. Q., G. Archambault, Representative

ALUMINUM SULPHATE

(Standard Filter Alum)

A "Heavy Chemical" indeed, and made and used in great quantities—but as carefully prepared, in the matter of purity and uniformity, as the most costly General Chemical Company product. For this reason, Aluminum Sulphate in the containers bearing the Shield of Standard Purity is preferred by those who measure values by results—and who like to have a feeling of confidence in the chemical products they buy.

GENERAL CHEMICAL COMPANY

40 RECTOR STREET NEW YORK

CABLE ADDRESS LYCURGUS, N. Y.

BUFFALO CLEVELAND PROVIDENCE ST. LOUIS PHILADELPHIA
CHICAGO PITTSBURGH DENVER LOS ANGELES SAN FRANCISCO
THE NICHOLS CHEMICAL CO., LTD., MONTREAL

General Chemical Company's Other Principal Products Include:

Sulphuric Acid
Oil of Vitriol, Oleum, Mixed Acid, Battery Acid

Sodium Sulphide
(Chip Patented)

Acetic Acid
Commercial, Redistilled Pure and Glacial

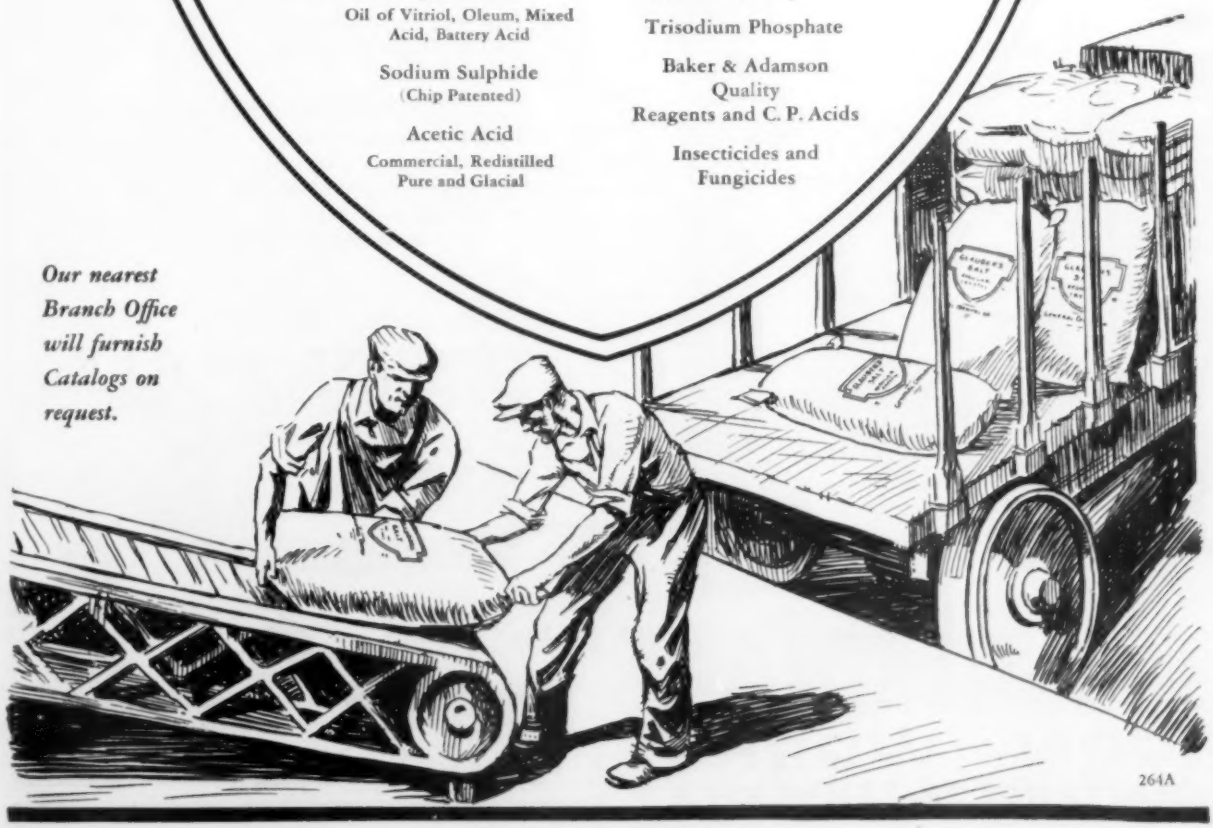
Disodium Phosphate

Trisodium Phosphate

Baker & Adamson Quality Reagents and C. P. Acids

Insecticides and Fungicides

Our nearest Branch Office will furnish Catalogs on request.



264A

THE MODERN AND IMPROVED LINE

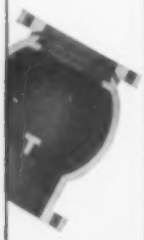
COLUMBIAN

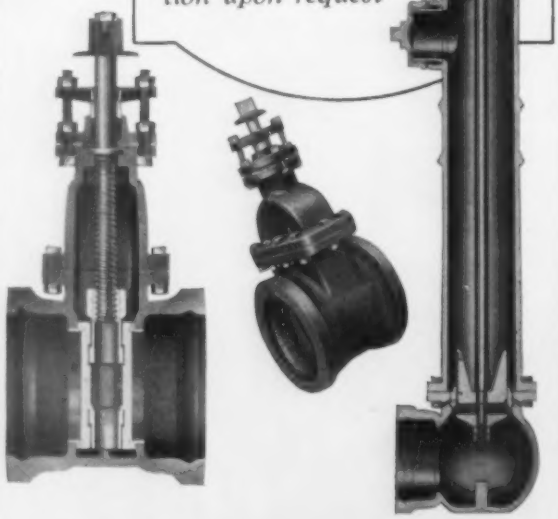
FIRE HYDRANTS
GATE VALVES-METER BOXES

Years of satisfactory service are built into Columbian Products. Skilled, concientious workmen construct them from the best material procurable and according to the newest advances in engineering design. Day in, day out, Columbian Fire Hydrants, Gate Valves, Meter Boxes, perform readily, efficiently, under the most strenuous use.

Experienced City Engineers and other Water Works officials know Columbian Quality of old, and invariably specify it. Try one Columbian Product, compare its service with that of any other make, and we'll wager that you'll be a regular Columbian customer from that time on.

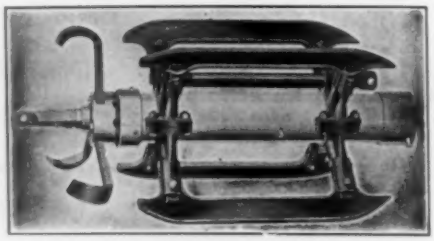
Detailed information upon request





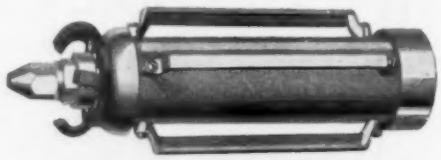
COLUMBIAN

IRON WORKS
CHATTANOOGA TENNESSEE



THIS IS THE STANDARD TURBINE adjustable to clean sewers from six to thirty inches in diameter—develops 3 horsepower at 60 pounds pressure—knives revolve at a speed of about 600 r.p.m. The water used to revolve the blades serves to clean and scour the sides of the sewer.

For the city with insufficient water pressure and funds, we have designed a new drag type cleaner—combining quality with low price. No other machine can possibly compete with it for either price or effectiveness.



THIS IS THE SELF-PROPELLING FERRET TURBINE—used to great advantage for cleaning dead ends, catch basins to manholes, and all stoppages within several hundred feet from the manhole. Sold on 30 day free trial.

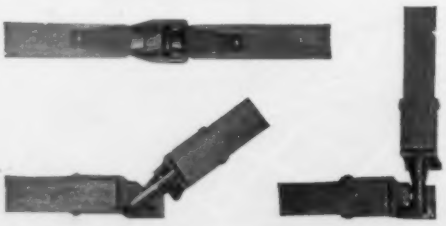
THE TURBINE WOOD SEWER RODS illustrated below, are the best and most inexpensive rods made! They are made in 3- or 3½-foot lengths of straight-grained, kiln-dried, carbolineum-dipped Oregon fir. *Send for sample rod and our illustrated catalog.*

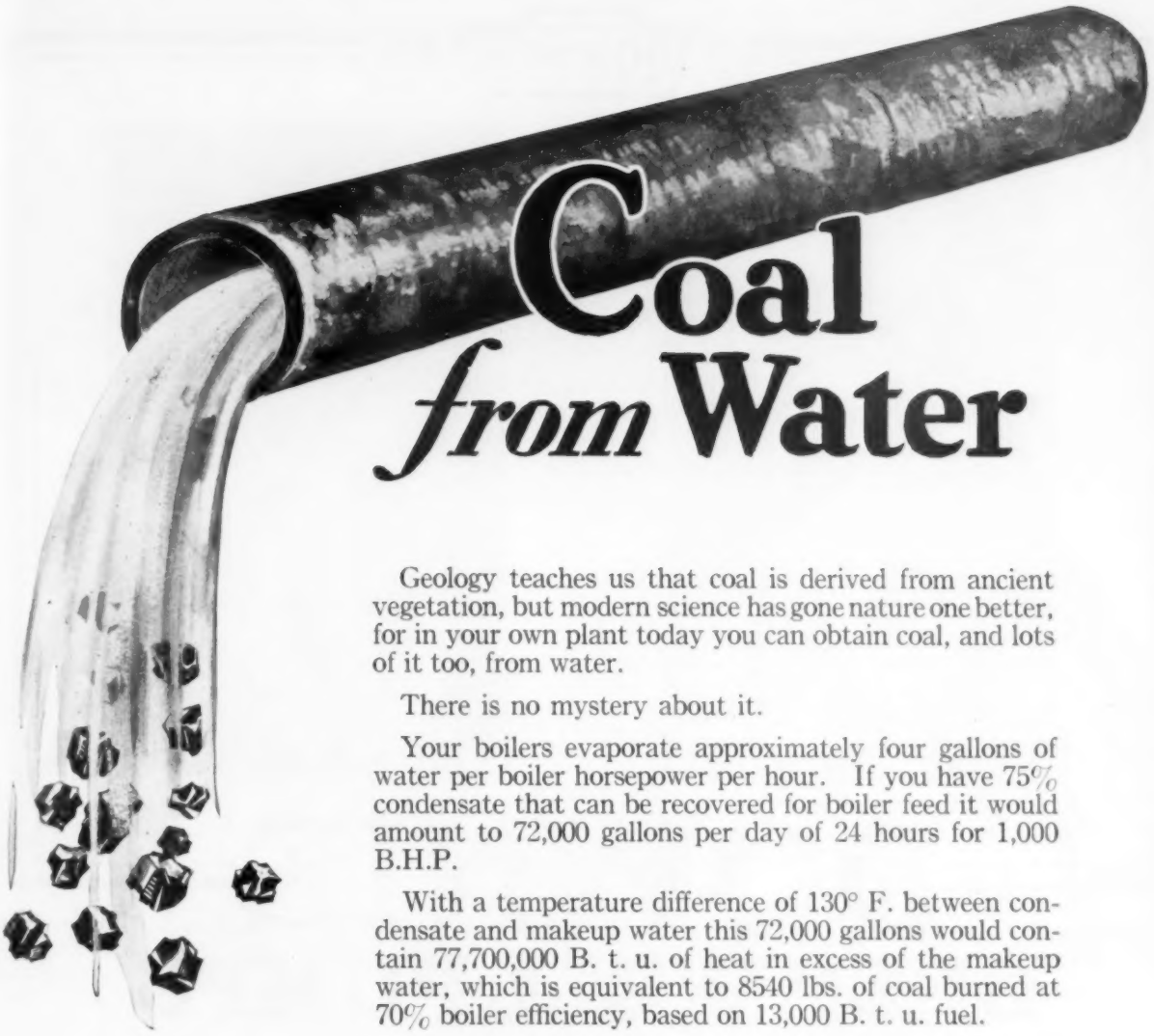
The

TURBINE SEWER MACHINE CO., INC.

5210 State Street

MILWAUKEE, WIS.





Coal *from* Water

Geology teaches us that coal is derived from ancient vegetation, but modern science has gone nature one better, for in your own plant today you can obtain coal, and lots of it too, from water.

There is no mystery about it.

Your boilers evaporate approximately four gallons of water per boiler horsepower per hour. If you have 75% condensate that can be recovered for boiler feed it would amount to 72,000 gallons per day of 24 hours for 1,000 B.H.P.

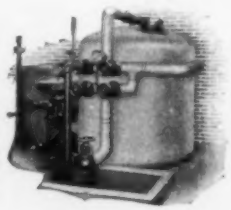
With a temperature difference of 130° F. between condensate and makeup water this 72,000 gallons would contain 77,700,000 B. t. u. of heat in excess of the makeup water, which is equivalent to 8540 lbs. of coal burned at 70% boiler efficiency, based on 13,000 B. t. u. fuel.

When there is oil in your condensate it cannot be used in your boilers, so it is discharged to waste, and with it goes 8540 lbs. of coal for every 1,000 horsepower developed in your plant per day.

Permutit Oil Removing Filters will remove from water all oil, either in suspension or emulsion. They make available for boiler feed the hot condensate that would otherwise be wasted—they practically turn that water into coal.

It will pay you to look into this subject further. Write for our free booklet, "Saving Fuel and Repairs with Oil Free Feed Water."

No obligations—write today.



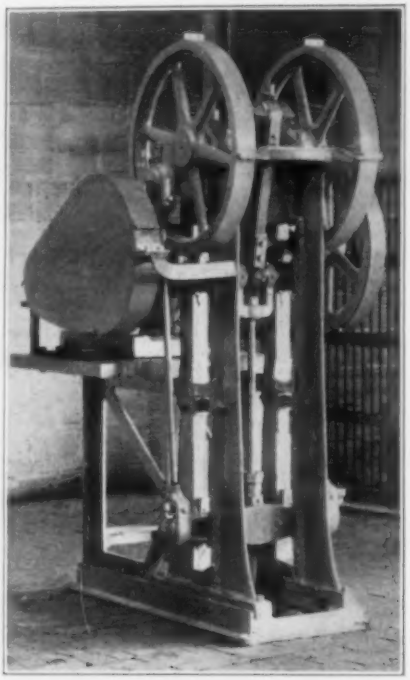
Permutit Oil Removing apparatus occupies but little space and is easy to maintain.

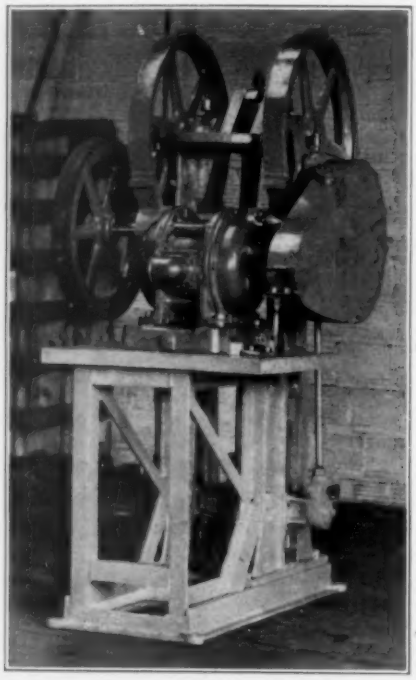
The Permutit Company

APPARATUS FOR REMOVING IMPURITIES FROM WATER

MAIN OFFICE: 440 FOURTH AVENUE, NEW YORK — BRANCH OFFICES IN ALL PRINCIPAL CITIES

TRADE MARK
DOWNIE
REGISTERED U. S. PATENT OFFICE





DOWNIE
DEEP WELL PUMPS

PRODUCE MORE WATER FROM ANY GIVEN SIZE WELL

—and require less attention and repairs than other pumps.

They have been in extensive use for more than a generation.

Thousands are in successful use throughout the United States and in many foreign countries.

Hundreds have been in continuous operation for more than twenty years, some on twenty-four-hours-per-day, seven-days-per-week duty, and are still giving good service.

We show here two views of our No. 31 Pump, using 4¾-in. working barrel, capacity 100 gallons per minute, operating against a total head up to 215 feet; guaranteed pump efficiency of 80%; two 12-in. strokes or 24-in. displacement.

There's a DOWNIE for every deep well pumping condition. Let us send you the catalog.

KEYSTONE DRILLER COMPANY

BEAVER FALLS, PA.

TRADE MARK
KEYSTONE
REGISTERED U. S. PATENT OFFICE

Wellsville, N. Y.
25 Tons

Garbage Disposal by THE United States Standard Incinerator

Municipal garbage disposal need no longer be a liability. It can easily and economically be an asset to any community.

Garbage disposal by the "United States Standard" high temperature incinerator means satisfactory garbage disposal—odorless—sanitary and economical.

The public health of any modern American community demands modern garbage and rubbish disposal.

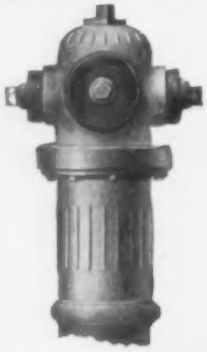
Send for Booklet No. 79

Pittsburgh-Des Moines Steel Company

81 Neville Island, Pittsburgh, Pa. **685 Hudson Terminal Bldg., N. Y. City**

Des Moines **San Francisco** **Seattle** **Chicago** **Atlanta** **Dallas**

Have You Found It?



—Your Ideal Fire Hydrant—

—If—

You had made those hydrants you are now using—what would you have added or left out?—You know—so do we.—Write today for Bulletin V-55-H —describing our

Revolving Head Hydrant

Since 1891

VOGT BROTHERS MFG. CO.

(NATIONAL FOUNDRY & MACHINE CO.) INCORPORATED

LOUISVILLE, KENTUCKY

VALVES — TAPPING SLEEVES — TAPPING VALVES

CHEMICALS

for Water Purification — *for* Treatment of Sewage

Liquid Chlorine

Single Unit Tank Cars — *Multi-Unit Tank Cars (1-ton Containers)*

150-lb. Cylinders

Chloride of Lime
Sulphate of Alumina

PENNSYLVANIA SALT MANUFACTURING COMPANY

Executive Offices:
Widener Building, Philadelphia, Pa.

Representatives:
New York, Chicago, Pittsburgh, St. Louis

Works:
Philadelphia and Natrona, Pa.
Wyandotte and Menominee, Mich.
Tacoma, Wash. (Under construction 1928)

"WATCH DOG"
WATER METERS

Inquiries Solicited

GAMON METER COMPANY

Main Office and Works
NEWARK, N. J.

CHICAGO, 360 N. Michigan Ave. — SEATTLE, 1410 L. C. Smith Bldg.

DONALDSON IRON CO.

Emaus, Lehigh Co., Pa.

Manufacturers of

CAST IRON PIPE

FOR WATER AND GAS

ALSO SPECIAL CASTINGS AND FLANGE WORK

INTERNATIONAL
WATER PURIFICATION PLANTS

THROUGH the years, the International Filter Co. has been the first to adopt improvements—the first to discard features that have proved hindrances of progress. The result has been that International equipment has maintained its leadership; that it is first now as always.

INTERNATIONAL FILTER CO.

Works & General Office: 333 W. 25th Pl., Chicago

International Filter Co. of Calif. San Francisco Los Angeles — **General Supply Co. of Canada** Toronto Ottawa Montreal

The offices of THE AMERICAN CITY, 443 Fourth Avenue, N. Y., are headquarters for information on equipment for municipal work. If you want catalogs, prices or names of manufacturers, let us help you.

WATER ■ WORKS ■

San Antonio, Texas—1,000,000 gallons

To install a Pittsburgh-Des Moines water tower, steel standpipe, or steel reservoir in connection with your water works system, will mean a saving in installation and real economy in maintenance and operating costs.

We build complete water works systems, including pipe lines, reservoirs, and filtration and purification plants.

Send for Municipal Booklet No. 1

Pittsburgh-Des Moines Steel Company
3 Neville Island, Pittsburgh, Pa.
905 Tuttle St., Des Moines, Ia.

New York Chicago Atlanta San Francisco Seattle Dallas

Why not remember to mention THE AMERICAN CITY?

Control Water Levels

with

Golden-Anderson Automatic Cushioned Controlling Altitude Valves

Cushioned in closing and opening. They are extensively used for automatically maintaining a uniform stage of water in reservoirs, tanks and standpipes. No floats or fixtures, inside or outside of tanks. No freezing troubles.

Three ways of closing these valves:

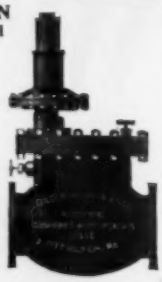
1st —Automatically by water.
2nd—By Electricity, if desired.
3rd—By Hand.

"Made with stop starter attachment for centrifugal pumps."

Works Both Ways

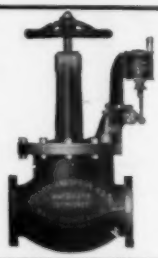
Golden-Anderson Valve Specialty Co.
1329 Fulton Bldg., Pittsburgh, Pa.

GOLDEN-ANDERSON
Pat. Automatic Cushioned Water Pressure Regulating Valves



1. Maintain a constant reduced pressure regardless of fluctuations on high pressure side.
2. Perfectly Cushioned by water and air. No metal-to-metal seats.
3. The best valve made for maintaining a constant low pressure where consumption is continuous.
4. Operates quickly or slowly as required — No attention necessary.
5. Positively no hammering or sticking. Sizes to 24 in.

GOLDEN-ANDERSON
Pat. Automatic Cushioned Check and Hand Stop Valve



1. Adapted for water service and boiler feed lines.
2. Always cushioned in opening and closing.
3. Quickly regulated for fast or slow closure.
4. No water hammer or shock any time.
5. Sizes 3" to 24" inclusive.

GOLDEN-ANDERSON
Pat. Cushioned Water Relief Valves

1. Automatically relieve excess pressure.
2. Prevent stress, strain and bursting of mains.
3. Correct mechanical construction.
4. Perfect air and water, cushioning.
5. No metal-to-metal seats. No hammering or shocks.
6. Angle and globe pattern. Sizes 3 to 24 in.

GOLDEN-ANDERSON
Patent Automatic Cushioned Controlling Float Valves

They carry a constant water level in feed water heaters by perfectly controlling the flow of makeup water.
Operated by protected enclosed copper float.
Cushioned by both air and water.
Operate without hammering, sticking or chattering. No metal-to-metal seats. Made angle or straightway.

GOLDEN-ANDERSON
Pat. Automatic Cushioned Water Float Valves

1. Automatically Maintain Uniform Water Levels in Tanks, Standpipes, etc.

Sizes ¼ to 24-in.

2. Instantly Adjusted to Operate Quickly or Slowly
3. Floats Swivel to any Angle—Most Satisfactory Float Valves known.
4. No Metal-to-Metal Seats—No Water Hammer or Shock.
5. Cushioned by Water and Air.

COLE TANKS

"Erected Anywhere"

Designs will be submitted to *meet any special requirement for tower and tank*, whether on a building, or odd location, or requiring auxiliary units.

The 600,000-gallon elevated tank shown at the left serves the city of Raleigh, N. C.

Our tanks have been built in practically every part of this country. They embody the requirements of all insurance authorities, and are so simply constructed as to make maintenance cost practically nil.

We also specialize in standpipes, boilers, flumes, etc.

R. D. COLE MFG. CO.
Established 1854
NEWNAN, GEORGIA

COLE TOWERS

$25,000

a year saved by a Layne Well System

Red Bank, N. J., was securing its water supply from 5 ordinary type wells by means of 2 air compressors; 2 steam boilers; 1 triple expansion and 1 compound pump; pumping 197,640,000 gallons at a cost of 13½ cents per thousand.

They supplanted that system with 2 Layne Gravel Wall Wells equipped with Layne Motor-Driven Pumps which, in 1928 produced 307,843,000 gallons at 05½ cents per thousand—a saving of $25,000 over steam and air.

There is nothing unusual about this saving. Every city that installs a LAYNE Well System quickly discovers they produce more water at less cost than any other known method.

It will pay you to get our proposition—no obligation.

Above: Old plant and wells requiring space of 200 ft. x 250 ft.

Left: New plant and well only 12 ft. x 12 ft. required

Right: Layne motor-driven pump

NEW YORK, N. Y.
NORFOLK, VA.
COLUMBUS, O.
CHICAGO, ILL.
SOUTH BEND, IND.
PARIS, FRANCE

LAYNE BOWLER
MEMPHIS INC. TENNESSEE

KANSAS CITY, MO.
HOUSTON, TEX.
LAKE CHARLES, LA.
STUTTGART, ARK.
MEMPHIS, TENN.
BUENOS AIRES, S. A.

***Check** the six essential requirements of any fire hydrant with Darling's important points*

1 Ample Water Supply—Darling's large barrel delivers the water at the nozzles at approximately the same pressure as at the mains.

2 Rugged Construction — Amply strong to safely withstand abuse incident to general fire service purposes and skidding automobiles.

3 Non - Freezing — Quick drainage non-clogging dependable operation and automatic in action.

4 Compression Valve—Accidental breaking of barrel or bending of stem only draws the valve tighter—no leaks—no floods. Closes with the pressure.

5 Minimum Maintenance—Minimum attention to maintain in operative condition and with all parts accessible through top and interchangeable.

6 Adaptability to Installation Conditions — The Darling Extension Section is only part required to raise hydrant, and nozzles can be pointed in any desired position.

DARLING VALVE & MFG. CO.

Williamsport, Pa.

New York
Chicago

Oklahoma City
Houston

DARLING

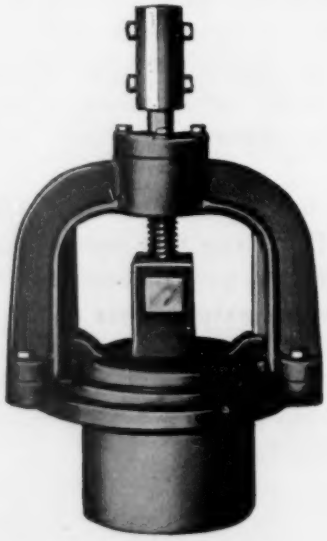
Fire Hydrants

EC&M Automatic Motor Control will keep this tank filled

Pumps driven by electric motors can be made to operate automatically by the application of EC&M Motor Controllers. Station operators can be eliminated, power consumption cut down, expensive standby equipment made unnecessary and other economies effected if your pumps are made to start and stop automatically as the demand varies.

Ask about EC&M Pump Control

The Electric Controller & Mfg. Co.
Cleveland, Ohio



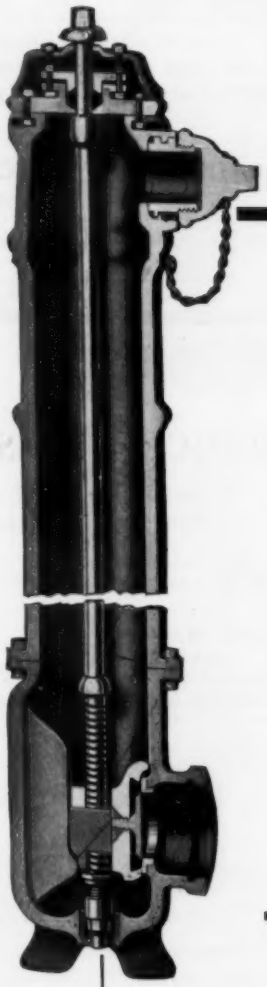
PLUG VALVES

Sluice Gates, Flap and Shear Gates

COLDWELL-WILCOX CO.

WATER STREET **NEWBURGH, N. Y.**

LUDLOW HYDRANTS



Always made of the best materials—

With interchangeable parts for forty years—

With improvements according to the best modern practice—

Producing no water hammer in closing—

With unrestricted passage for maximum water delivery and least friction—

With drain valve in bottom emptying the hydrant completely—

One strong rod in the hydrant operating both main and drain valves—

A patented locking device that prevents flooding if the hydrant is broken off—

And plenty of other advantages as described in our circular—

Is it any wonder that LUDLOW HYDRANTS have been helping to fight fires in more than 3,000 cities for many years?

The LUDLOW VALVE MFG. CO.

TROY NEW YORK

BRANCHES:

New York, 11 West 42nd St.
Boston, 1112 Tremont Bldg.
Philadelphia, Harrison Bldg.
Pittsburgh, 422 Oliver Bldg.
Chicago, 731-733 The Rookery
Kansas City, R. A. Long Bldg.

Southern Representative: W. P. Wilcox, 4th National Bank Bldg., Atlanta, Ga.

Waterworks Equipment Co., Salt Lake City, Utah
Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.
Wm. P. Horn Co., San Francisco and Los Angeles, Calif., and Seattle, Wash.

For complete information on both hydrants and valves, see our 212-page catalog. ***EVERY LUDLOW VALVE has ground seats and gate faces, insuring an absolutely tight seating surface.***

POMONA

Water Lubricated Turbine

PUMPS

Produce the cleanest water at lowest cost. No oil required below surface. No pit needed. Easy to install. Manual or automatic control. 25 to 5000 g.p.m. For wells 4 in. or larger. Ask for Municipal Bulletin.

Oceans of Water

POMONA PUMP CO.

615 Bessemer Bldg.
Pittsburgh, Pa.

206 Commercial Street
Pomona, Calif.

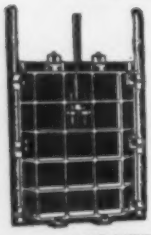
Roberts Filters

Over a billion gallons of water are now filtered daily by Roberts Filters on municipal water supply systems alone. Hundreds of industrial installations deliver almost an equal amount. Our list of recirculation plant installations includes the most modern outdoor and indoor swimming pools in the country. Write us for information.

ROBERTS FILTER MANUFACTURING CO.
602 Columbia Ave. Darby, Pa.

PURE WATER

RODNEY HUNT



SLUICE GATES

Also Butterfly, Flap and Mud Valves, Shear and Filler Gates

"Dependable Equipment for Responsible Positions"

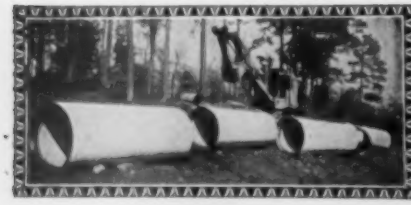
RODNEY HUNT MACHINE CO.
30 LAKE STREET ORANGE, MASS., U. S. A.
New York Philadelphia Pittsburgh Chicago

FOR EVERY DEEP WELL PUMPING NEED!
The "POMONA" DOUBLE STROKE DEEP WELL POWER PUMP

Catalog Available

"UNITED" IRON WORKS INC. FOR SERVICE

UNITED IRON WORKS, INC.
SPRINGFIELD, MISSOURI



LOCK JOINT
Reinforced Concrete
PRESSURE PIPE

LOCK JOINT PIPE CO. *Ampere — N.J.*

THE Lock Joint Pipe Company has had nearly a quarter of a century and many hundreds of miles of experience to bring its pipe and pipe lines to the high degree of success they now enjoy.

Permanence, High Carrying Capacity, Tightness, Expansion Joints, Long Life, No Tuberculation

The EDDY Valve

The Eddy Valve has a number of distinctive features which it will pay you to study. For example: the gates are free to revolve on the trunnions, so as not always to seat in the same position.

Write us for further details

Also manufacturers of the well-known Eddy Hydrant

EDDY VALVE COMPANY
WATERFORD NEW YORK

KENNEDY

for water-works service

WATERWORKS superintendents all over the country can testify to the uniformly dependable service and trouble-free operation of Kennedy equipment. On the water supply and fire protection systems of hundreds of municipalities, Kennedy Valves and Fire Hydrants are giving thorough satisfaction, promptly responding to every demand, and efficiently meeting every emergency.

The big Kennedy line of water gates in sizes up to 60-inch for low, medium and high pressures, and for manual, hydraulic, or electric control, and Kennedy Fire Hydrants as well, are designed in accordance with the specifications of the American Water Works Association.

THE KENNEDY VALVE MFG. CO.
Elmira, N. Y.
Branches in principal cities

VALVES—PIPE FITTINGS—FIRE HYDRANTS

Anaconda Copper Service Tubing

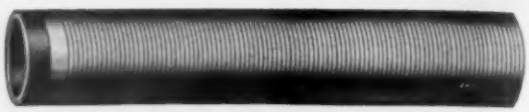
—for use with compression fittings

THE American Brass Company offers Anaconda Deoxidized Copper Tubing in straight lengths up to 20 feet and in coils up to 60 feet. This tubing can be connected directly with the corporation stop without a gooseneck and because of its flexibility, it can readily be bent to avoid underground obstructions. All Anaconda Service Tubing is specially deoxidized in order to meet more rigid physical requirements and withstand corrosion better.

ANACONDA

THE AMERICAN BRASS COMPANY

General Offices: Waterbury, Connecticut
Offices and Agencies in Principal Cities
Canadian Mill: ANACONDA AMERICAN BRASS LTD
New Toronto, Ontario



JOHNSON SCREENS MAKE EFFICENT AND PERMANENT WELLS

The Johnson has from 30 to 50 per cent more inlet area than other types of screens. This results in more water and lower pumping costs. The slot is completely undercut and will not clog.

Permanence is insured by the use of Anaconda Red Brass. Thorough tests made over a period of ten years or more have proved that this metal will not corrode under the most severe conditions.

Let Us Send You Our New Bulletin

EDWARD E. JOHNSON, INC.
2304 Long Ave. Saint Paul, Minn.

Buckling and Cracking of concrete roads

can easily be prevented with CLEVELAND DOWEL SLEEVES. Made of heavy chip board, thoroughly waterproofed, they are permanently effective in the roadbed. Ask for sample today.

Any length and diameter can be supplied

The CLEVELAND CONTAINER CO.
Manufacturers of Paper Tube Products
10030 Berea Rd. Cleveland, O.
Plants: 7124 Chatfield Ave., Detroit.
Hoboken Terminal Bldg., Hoboken, N. J.

SIGNIFICANT ADVANTAGES
Model "O" Compression Hydrant

1. Has no stuffing box, therefore needs no packing.
2. Quick opening—4½ to 5 turns in comparison with 15 to 20 on other makes.
3. Positive drainage—no possibility of clogging.
4. Addition of flanged extensions permits any variation in trench depth.
5. Furnished with or without Frost Jacket.
6. Bronze used in all working parts subject to wear.

Water Steam **"MICHIGAN"** Gas Oil
Valves—Sluice Gates—Hydrants
MICHIGAN VALVE & FOUNDRY CO.
DETROIT
Visit our booth at Toronto

THE PACIFIC FLUSH-TANK CO.

9 Park Place
New York
and
4241 Ravenswood Ave.
Chicago, Ill.

Publishes

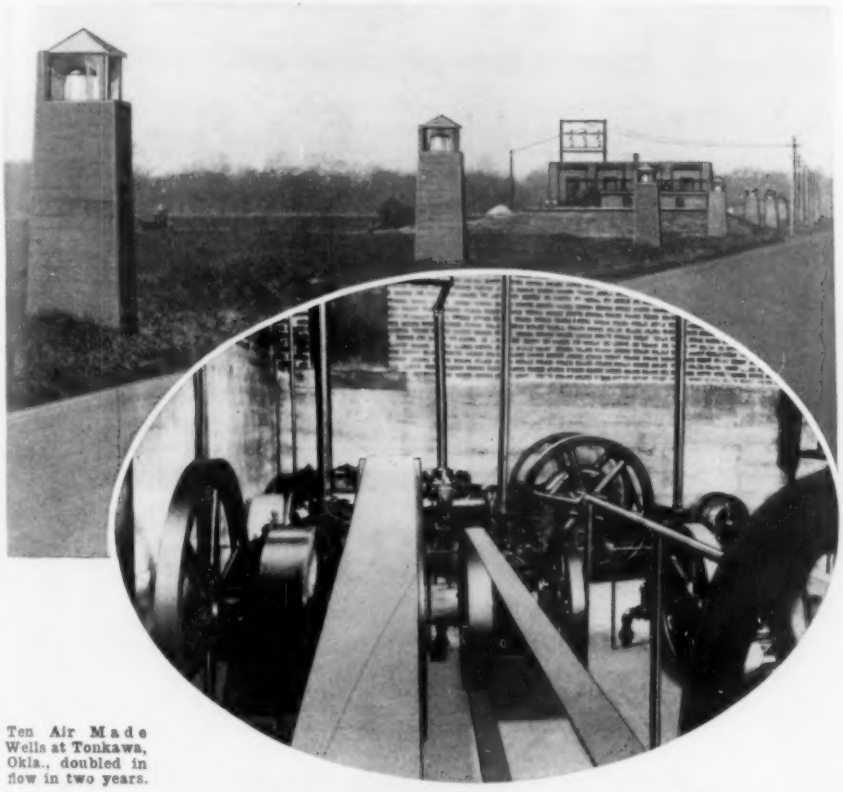
NINE CATALOGS

on

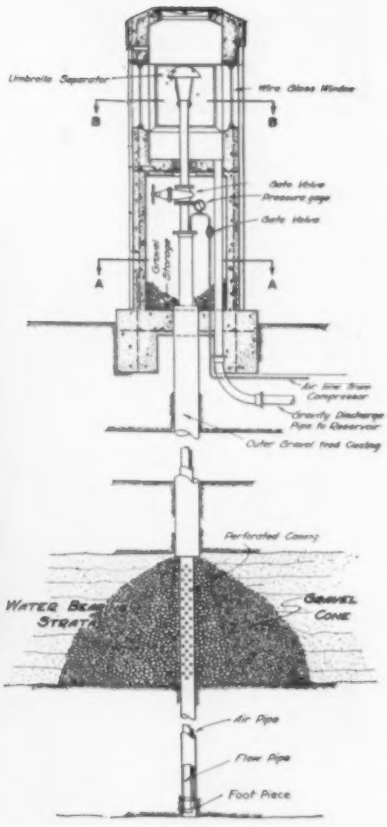
Sewage Disposal Apparatus
Sewer Flushing Siphons
Sewer Pipe Joint Compound
Sewage Ejectors
Sludge Pumps
Flush Tank Water Regulators
Imhoff Tanks

Full information regarding our products sent to anyone interested. Write to our nearest office indicating line you desire to know about.

these wells don't SLOW UP



Ten Air Made Wells at Tonkawa, Okla., doubled in flow in two years.



Air Made Well Detail

. . . . . Air Made wells now solve the water problems of scores of cities

A FEW years ago, when sand choked well screens and reduced inflow, or cut out pumps—there was no permanent remedy.

Many water works men were convinced that there were only two permanent sources of water—deep rock strata, and surface supplies.

Permanent Wells in Sand—No Need of Deep Wells

But then came "Air Made" wells. Where sand strata were the only source of good water available, this source became dependable. Where water could be taken from either shallow sand or deep rock strata—Air Made wells saved the cost of lifting water from great depths.

Briefly, the Air Made well process removes the sand from the well, and replaces it with coarse gravel. The gravel lets the sand through, acts as a collecting basin, and supports the overlying material.

After the well goes into operation, it is "backblown" at intervals, and more gravel is inserted. Collecting basins grow larger and larger, and the well gives more and more water as time goes on.

As Air Made wells are pumped by Sullivan Air Lift—there are no moving parts in the well to be damaged by sand passing through; and varying water levels or crooked wells are no obstacles.

Wells Double Flow in Three Years

Ten Air Made Wells in Tonkawa, Okla., doubled in flow in three years, while ordinary wells all around them, went dry.

7 Million g.p.d. from 10 Wells

Amarillo, Texas, after securing only 90 g.p.m. from mechanically pumped wells, now has a daily capacity of 7,000,000 gallons, with ten Air Made wells.

Maintenance Almost Nothing for Three Years

Greenleaf, Kansas, had water troubles for forty years. Repair bills in the pumping plant equalled power bills. But three years ago an Air Made well was installed, and repairs since then have been $10.00.

5 Wells Instead of 40

Chandler, Oklahoma, replaced 40 ordinary wells and a huge dug well, with five 8-in. Air Made wells.

Concordia, Greensburg, and Lewis, Kansas—Stansberry, and Albany, Missouri—and many other cities have made their water supplies permanent, and discarded chronic pumping troubles, with Air Made wells and Sullivan Air Lift. And in every instance, flow from the wells is constantly increasing.

Why not send the coupon today for the latest information on Air Made Air Lift wells?

COUPON

Send me latest water supply booklet.

Name .....

Address .....

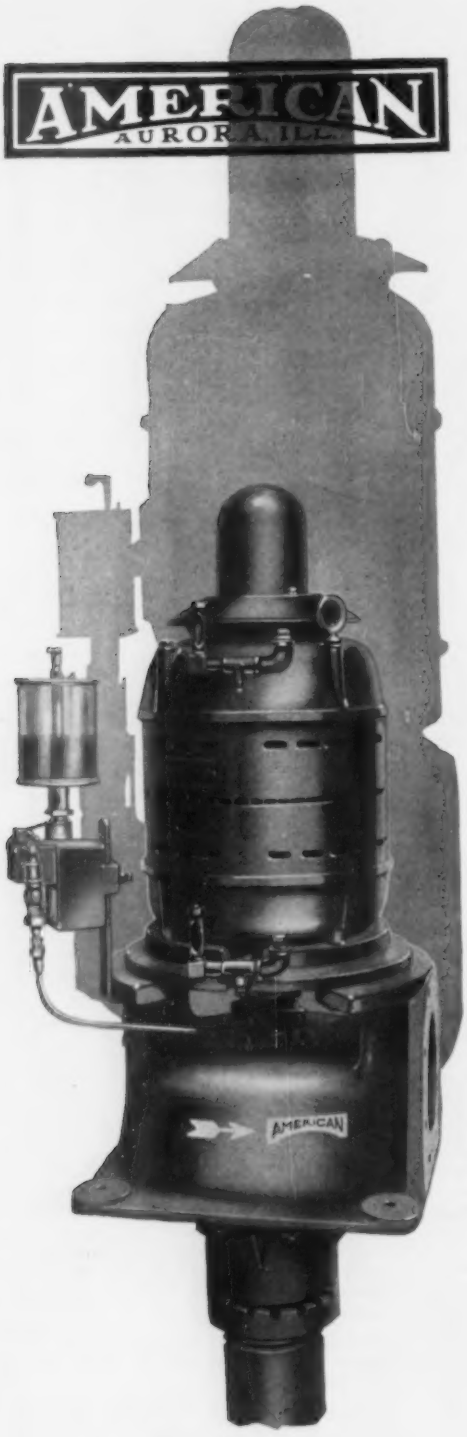
Occupation .....

SULLIVAN MACHINERY COMPANY
408 N. Michigan Ave., Chicago

SULLIVAN AIR LIFT

for dependable well water supply anywhere

Why not remember to mention THE AMERICAN CITY?



ANNOUNCING THE 6" & 8" AMERICAN DEEP WELL TURBINES

The new 6 in. and 8 in. "American" Deep Well Turbines are ready.

Complete engineering data is now available.

The turbine head proper has great rigidity and compactness. Provision is made for complete drainage of all waste oil and water leakage. The discharge is located above the floor level. The motor is fixed directly above and to the pump shaft, and is furnished for alternating current.

The turbine proper is a special style of the turbine type of centrifugal and consists of one or more stages or suitable diameter to enter bored wells of 6 in. and 8 in. inside diameter. The number of stages may be varied according to the head required.

The supporting pipe is made up in 10 ft. sections fastened together with steel screwed couplings.

All bearings are oil lubricated by gravity feed from the surface, the gravity feed being electrically controlled. The lower bearing of the turbine is of the peg type and a motor thrust bearing is provided to carry the load of line shaft.

Bulletins giving complete details of mechanical construction and performance under various conditions are now available, and will be furnished on request.

Branch Offices:

CHICAGO, ILL. 1615 First National Bank Bld. | NEW YORK CITY Room 523 - 165 Broadway | LOS ANGELES, CALIF. 416 E. Third St.

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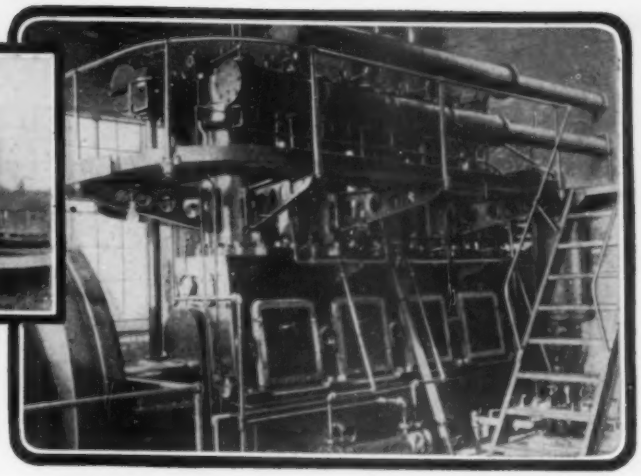
THE AMERICAN WELL WORKS

General Offices AURORA, ILLINOIS *and Factory*



Why Yale, Okla., likes McIntosh & Seymour Diesel Engines

	586285 kw. produced with steam power	622500 kw. produced with Diesel power	Saving effected by the Diesel engine
Operation	$10,528.57	$5,457.16	$5,071.41
Fuel	5,539.00	1,507.49	4,031.51
Labor	4,026.75	3,146.20	880.55
Total	$20,094.32	$10,110.85	$9,983.47

THE municipal water, electric lighting and power station here houses a steam plant as you can see from the stack, but the steam outfit is now as still as the building in the picture.

Even with good high-speed engines and with natural gas or oil as exceptionally cheap boiler fuel, this steam plant piled up costs that the owners did not appreciate—so a 400-b. hp. McIntosh & Seymour Diesel Engine with generator was installed late in 1927. That switching over showed good judgment is now proved by the above records from the corresponding five months performance during the last year with steam and during the first with Diesel power. Note in addition to the money savings, the 6 per cent power increase provided by the Diesel engine.

Performance of the Diesel Engine for the month of December, 1928

Total Production	110,227 kw.-hr.
Production per gal. of fuel	11.04 kw.-hr
Peak load	225 kw.
Costs, Salaries	$490.30
Lubricants	19.12
Wiping rags	8.50
Fuel oil	219.40
Gas under heater	9.24
Per kw.-hr. 0.6772 ct.	$746.56

The above figures reduced to a kilowatt-hour basis show that operation with Diesel power costs less than half as much as with steam power. The additional figures for December, 1928, as also given are even more favorable to the Diesel engine, and indicate that it will pay for itself in a few years, although the very low-priced boiler fuel here made steam power more desirable than in many similar plants.

If you seek or are responsible for power production at low cost, or want additional power at attractive cost in an existing overloaded plant—steam, hydro-electric or Diesel—it will pay you to get more information about McIntosh & Seymour Engines.

Have our Service Department submit suggestions, costs and money-return figures, or at least send for and read our literature.

McINTOSH & SEYMOUR CORPORATION, Auburn, N. Y.

New York City	Kansas City, Mo.	Jacksonville, Fla.	San Francisco, Cal.	Houston, Tex.
149 Broadway	1016 Baltimore Ave.	412 Bisbee Bldg.	514 Matson Bldg.	2708 Esperson Bldg.

McINTOSH & SEYMOUR DIESEL ENGINES

Why not remember to mention THE AMERICAN CITY?

THE STANDARD for 50 YEARS

Automatic Pressure Control Valves

Feed Water Filters

Portable Fire Hydrants

Hydraulic Engines

Hydraulic Booster Pumps

ROSS VALVE MFG. CO., INC.

ARCHIBALD STREET — TROY N. Y.

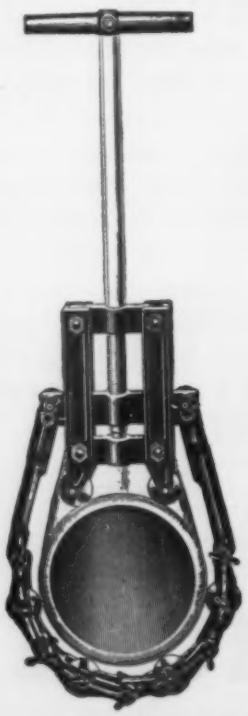
Most of us have no sewer problems because our grandfathers built sewers with vitrified clay pipe

CLAY PRODUCTS ASSOCIATION
CONWAY BUILDING
Chicago

VITRIFIED Salt Glazed CLAY
Sanitary Sewer Pipe

AC6-Gray

ONE CUT SAVES THE PRICE



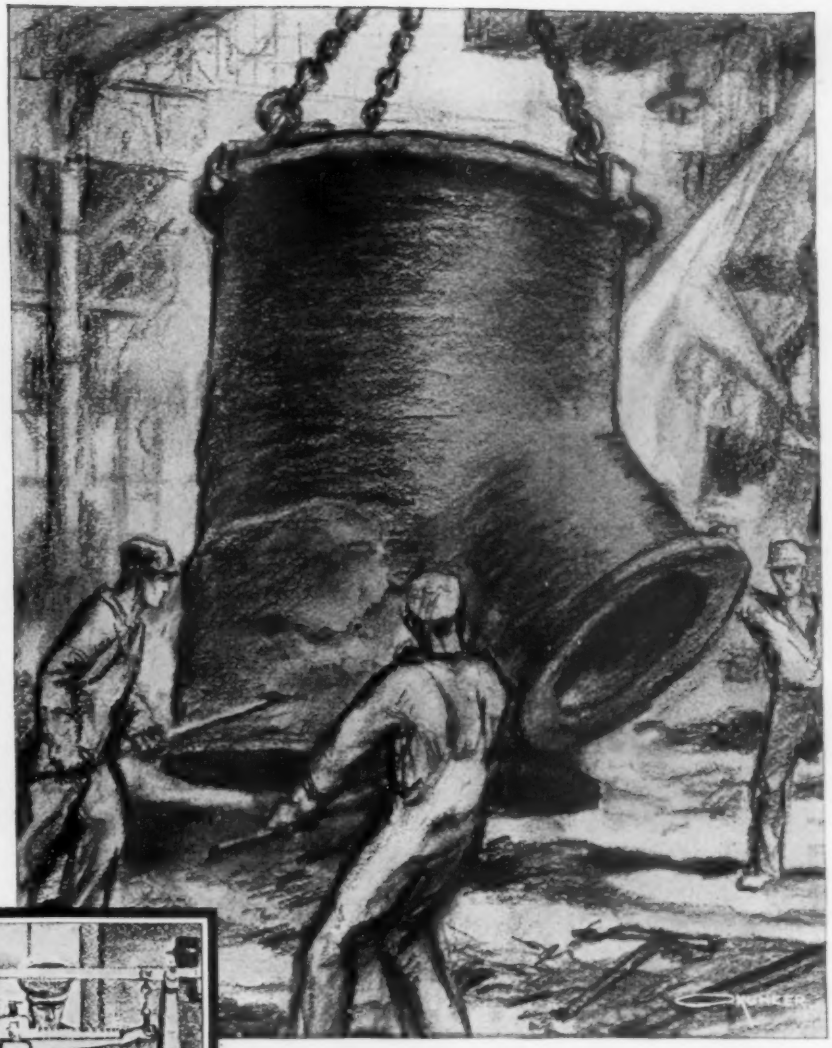
YOU, too, may save the cost of this pipe cutter on one job, just as many other contractors and water companies have done.

The ELLIS PIPE CUTTER

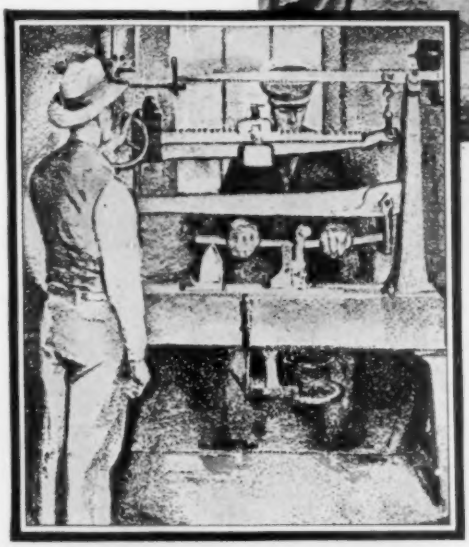
with its six keen rotary cutting blades eats its way right through any pipe in double-quick time. Use No. 01 for all kinds of pipe 4 to 8 inches in diameter, or No. 1 for pipe 4 to 12 inches in diameter.

Write for circular

ELLIS & FORD MFG. CO.
38 Piquette Ave. DETROIT, MICH.



In the modern foundry, cast iron specimen bars 26″ x 2″ x 1″ are tested from each run of metal. The bars when placed flatwise upon supports 24 inches apart must sustain a load of 2000 pounds at the center and show a deflection of not less than .30 inches before breaking.



CAST IRON

The "Q-check" symbol shown above has been adopted as the trademark of The Cast Iron Pipe Research Association. Insist on this "Q-check" mark when specifying cast iron pipe for gas, water, sewer, or industrial service. For complete information write to The Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, Peoples Gas Building, Chicago.

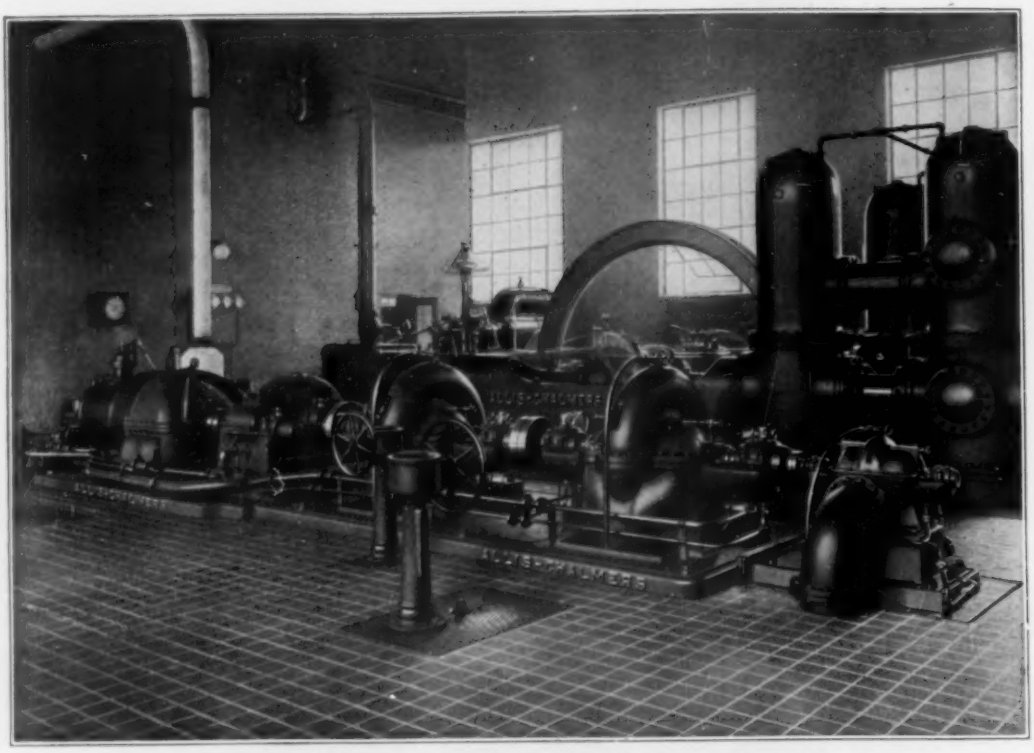
SCIENCE and invention have been diligently employed in the ancient but alert industry of cast iron pipe manufacture. There are no wasted minutes or motions in the modern cast iron pipe foundry. The work proceeds with the smoothness of practised team-work. Old-time foundry men would doubtless be amazed to observe the many appliances used today to speed the production and assure the uniform quality of modern cast iron pipe.

* * *

The Cast Iron Pipe Research Association is a service organization of leading pipe founders, formed to promote the scientific improvement and proper use of Cast Iron Pipe. Pipe bearing the Association "Q-check" mark may be obtained from the following: American Cast Iron Pipe Co., Birmingham, Ala.; James B. Clow & Sons, 219 N. Talman Ave., Chicago, Ill.; Donaldson Iron Company, Emaus, Pa.; Glamorgan Pipe and Foundry Co., Lynchburg, Va.; Lynchburg Foundry Company, Lynchburg, Va.; National Cast Iron Pipe Company, Birmingham, Ala.; United States Cast Iron Pipe & Foundry Company, Burlington, N. J.; Warren Foundry and Pipe Company, 11 Broadway, New York City.

Copyright 1929, C. I. P. R. Ass'n.

CAST IRON PIPE



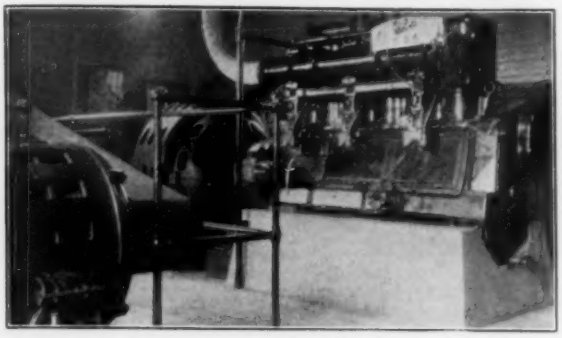
15 M. G. D. Geared Steam Turbine Driven Centrifugal Pumping Unit in Foreground—6 M. G. D. Horizontal Cross Compound Corliss Crank and Flywheel Pumping Background Furnished the Indianapolis Water Company

CENTRIFUGAL PUMPS OR PUMPING ENGINES

Both types built in the same substantial way. The illustration shows an Allis-Chalmers pumping engine and an Allis-Chalmers geared steam turbine driven centrifugal pumping unit in the same station. This is an example of the confidence users can place in Allis-Chalmers pumping equipment ased on our long experience in furnishing economical and reliable pumps for city or other service.

ALLIS-CHALMERS

MILWAUKEE, WIS. U. S. A.



At Waseca, Minn., Viking II-6 cylinder 425 HP. Sterling engine direct connected to E. M. 250 KVA. 2300-volt generator for standby service.

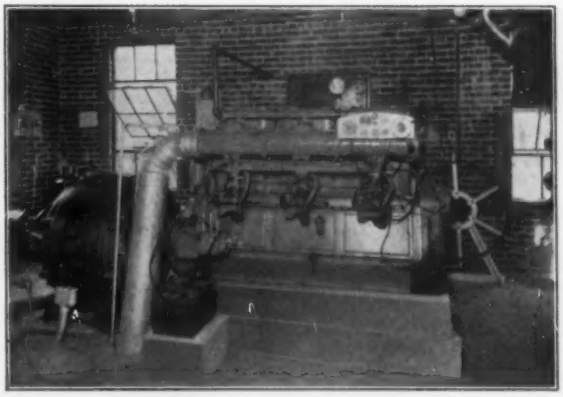
IN EMERGENCY

When pumps are down water is priceless

YOU CAN START INSTANTLY

Sterling High Duty Internal Combustion Engines

and pump water for about 2 cents a horsepower per hour, generate electricity for 2 1-2 cents a KWH.



At the Bessie Mine of the Sloss-Sheffield Co., at Birmingham, Ala., a Sterling Viking II-6 cylinder 425 HP. engine connected to a Westinghouse generator serves as a standby when electric power fails.

12 to 565 H.P., 1200 R.P.M., $20 to $30 a H.P.
Paralleling guaranteed

STERLING ENGINE COMPANY

Dept. C-11
Buffalo, New York

HYDRAULIC DREDGES FOR WATERFRONT IMPROVEMENTS

The illustration shows a Diesel driven hydraulic pipe line dredge of medium size. Machines of this type are economical and efficient for deepening storage reservoirs, ponds and lakes, and for filling the adjacent low land. Many cities own and operate dredges of this type.

In nearly every city dredges can be used in the improvement of municipally owned property. The dredges may be either municipally owned, as in the illustration above, or, under other conditions, the dredging work is done by contractors owning suitable equipment.

The hydraulic pipe line dredge is the only machine which will, in one operation, excavate underwater material and convey it to the desired disposal point. Such machines are extensively used for park improvements; for the deepening of lakes and ponds, including the filling of adjacent land for playgrounds and golf courses; for maintaining the depth in reservoirs; for mosquito control by filling marsh land; and for the construction of airports and industrial property.

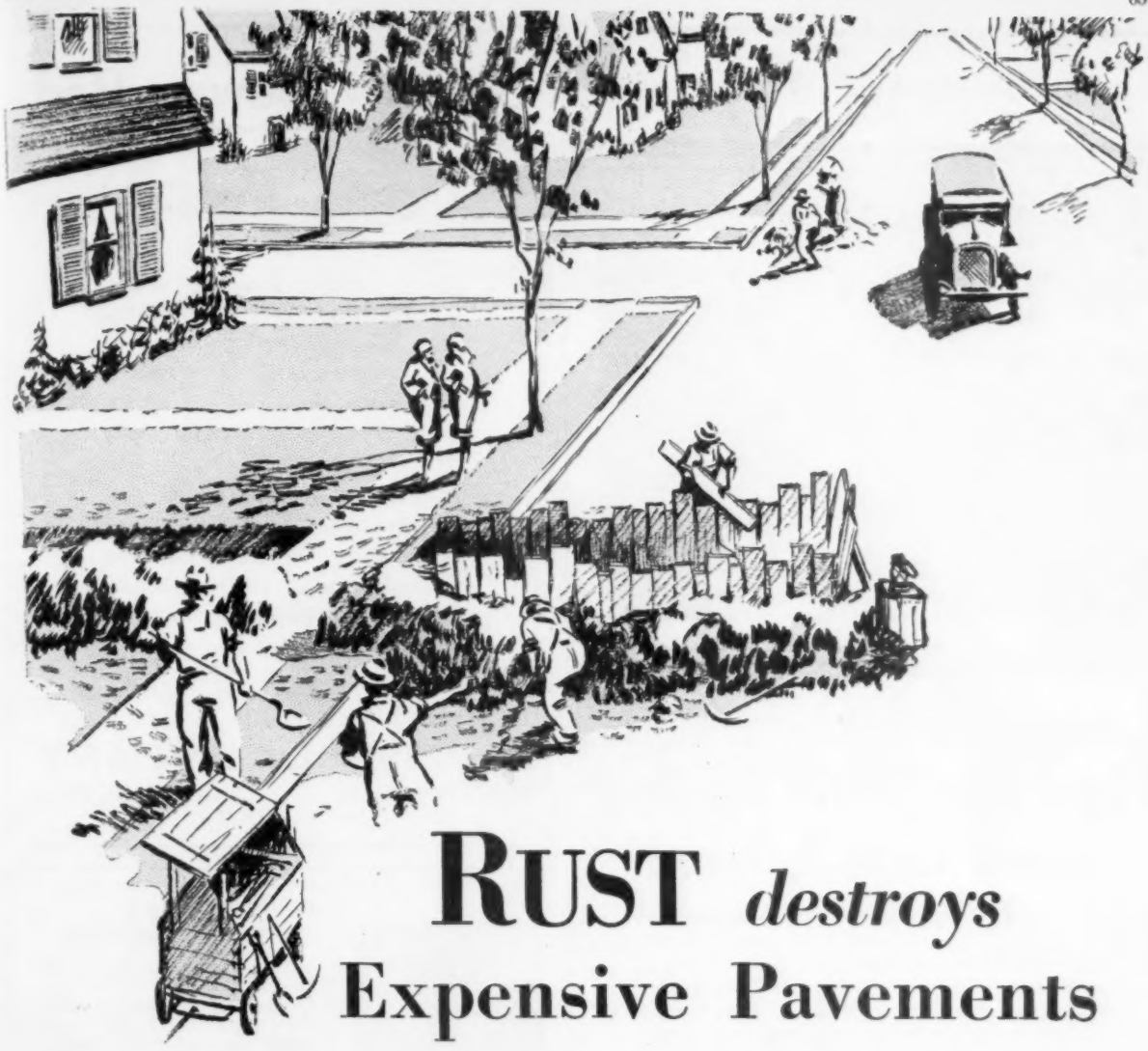
Without obligation our engineers can give you information about any dredging or filling problem. Send for our latest catalogs.

ELLICOTT MACHINE CORPORATION

1111 Bush Street BALTIMORE, MD.

Hydraulic Dredges—Any Size—Any Service

Why De Laval
Turbine Driven Pumps
are Replacing
Reciprocating Pumps
They pump water at the lowest possible cost when all items of expense are considered.
The first cost is less — Building and foundation costs are lower — Upkeep and attendance expenses are reduced — High duties are realized.
The photograph shows a De Laval 40 MGD. geared turbine driven centrifugal pump installed alongside a 30 MGD. triple expansion pumping engine in the Milwaukee Water Works, both units pumping against the same head.
De Laval Steam Turbine Co., Trenton, N. J.



RUST *destroys* Expensive Pavements

EVERY city, town and village boasts of its streets and sidewalks. Citizens point with pride to such improvements. When water service pipes which carry the water into the homes are made of corrodible metal they soon become rust clogged. The result is that when the home owner turns on a faucet only a tiny trickle of reddish water drips. The rusting service pipe soon bursts. Streets and lawns must then be torn up so that necessary repairs can be made. All of which results in a heavy financial burden to the taxpayer.

Copper or Brass water service pipe cannot rust. Municipal governments never have to tear up expensive pavements to make repairs and replacements.

Full information on the advantages of Copper or Brass pipe will be furnished you by this Association without cost or obligation on your part.

COPPER & BRASS
RESEARCH ASSOCIATION
25 Broadway, New York

Midwestern Office:	*Canadian Office:*	*Pacific Coast Branch:*
Landreth Building	67 Yonge Street	Architects Building
St. Louis, Mo.	Toronto, Ont.	Los Angeles, Cal.

QUALITY CHECKED

Use MONO-CAST Pipe for Both Water and Gas Lines

MONO-CAST centrifugal cast iron pipe represents an ideal combination of those features essential in any pipe used for *both* water and gas lines. Made of cast iron, *it's permanent*—lasts for centuries. Cast in a refractory mold, *it has high tensile strength.* Of uniform structure, free from casting strains, *it bends as well as resists bending.* Bell-and-spigot, with the bead *cast on* the spigot end, *it makes tight joints.* In 16-foot lengths, *it costs less to lay.* These are reasons why more than 12,000,000 feet of MONO-CAST centrifugal cast iron pipe are now in service. Like the engineers who laid this tremendous footage, you'll find MONO-CAST best all down the line, whether water line or gas line.

Write for illustrated booklet

AMERICAN CAST IRON PIPE COMPANY

BIRMINGHAM, ALABAMA

CHICAGO KANSAS CITY LOS ANGELES SAN FRANCISCO
MINNEAPOLIS NEW YORK CITY SEATTLE DALLAS

Security Sewer Rod

Security Rods are made from second-growth hickory, with malleable iron couplings swedged or shrunk down very tightly on the curved places at ends of sticks. Security couplings *cannot* come off.

Joint and unjoint easily and quickly—light weight—long runs easily made. No slack, but lend themselves to all practical bends. They cannot buckle or uncouple in the duct.

Send for Flyer No. 16

F. BISSELL COMPANY
812 Lafayette St. Toledo, Ohio

THIS IS A GATE VALVE HOUSING

that is adequate under the heaviest traffic. It is non-breakable, nontilting, noiseless. Let us tell you more about it, and about other Reading specialties such as curb boxes, meter box covers, meter testers, melting furnaces, jointing materials and miscellaneous water-works tools — all described in our Catalog A.

READING METER REPAIR CO.
READING, PENNA.

ROTARY PUMPS
FIRE HYDRANTS
FIRE APPARATUS

Waterous

Send for our Complete Catalog
Agents in Principal Cities

WATEROUS COMPANY
St. Paul, Minnesota
See our page in the "Municipal Index"

McWANE PIPE

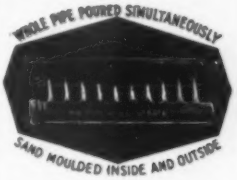
A Chinaman's Abacus— And Cast Iron Pipe

A thousand years ago, the abacus was a good adding machine. But the Chinese standardized on it—and use the same crude instrument today.

Twenty years ago the old specifications for cast iron pipe were good—the best then known.

But in America sometimes things happen rather fast. In the past twenty years there have been improvements made in the art of cast iron pipe making that are almost startling.

When you close your specifications with only the old standards, you are denying yourself the advantages and economies of these improvements as contained in McWane Pipe.



McWane Pipe is cast almost instantaneously in green sand molds, with green sand core. It is the only modern weight pipe molded "in sand inside and outside."

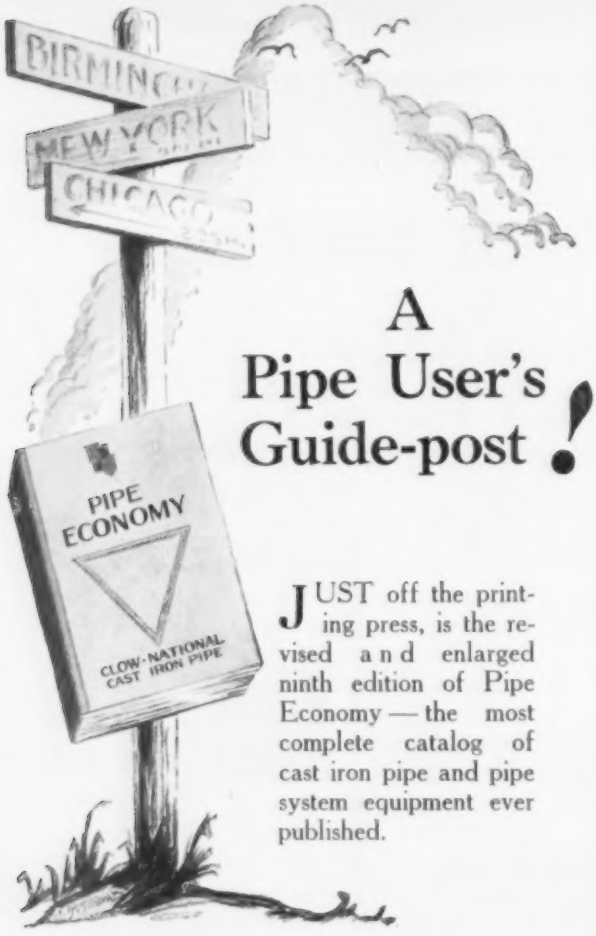
WRITE FOR ILLUSTRATED LITERATURE

McWANE CAST IRON PIPE CO.
BIRMINGHAM, ALA.

PACIFIC STATES CAST IRON PIPE CO.
PROVO, UTAH

SALES OFFICES IN PRINCIPAL CITIES

McWANE
CAST IRON PIPE



A Pipe User's Guide-post!

JUST off the printing press, is the revised and enlarged ninth edition of Pipe Economy — the most complete catalog of cast iron pipe and pipe system equipment ever published.

It is a real "guide-post" for any man who uses or is interested in pipe. There are complete specification, dimensions, weights, valuable ideas and miscellaneous data for engineers and contractors. It is 6 x 9 inches in size, handsomely bound for your office library.

We will mail this book without charge to any person connected with the use of cast iron pipe.

Write for your copy at once. Address either company.

James B. Clow & Sons
Chicago, Illinois

National Cast Iron Pipe Co.
Birmingham, Ala.

Branch Sales Offices: Kansas City, Dallas, Los Angeles, San Francisco, Salt Lake City, Minneapolis, Milwaukee, Pittsburgh, Boston, New York, Philadelphia.

CLOW-NATIONAL
CAST IRON PIPE
"Everything for a Pipe System"

FIELD SUPERINTENDENCE

of all kinds of

PAVING

With Field Laboratory Control of all Asphalt Mixes

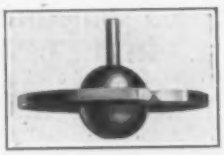
Inspection and Tests of All paving and structural materials.

We do not sublet our work

ROBERT W. HUNT CO.

Engineers

2200 Insurance Exchange Bldg. Chicago



NOWARP DISCS

a million in use

Because:

No *ordinary* hard rubber disc could possibly stand the sort of service NOWARP Discs are able to withstand. When hot water backs up into the meter, a NOWARP Disc will withstand the heat up to 270 degrees without injury, and the meter will show the same accuracy as before, down to and including a 1/32-inch stream!

Send for illustrated booklet

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THE CENTRAL FOUNDRY COMPANY
420 Lexington Ave., New York City

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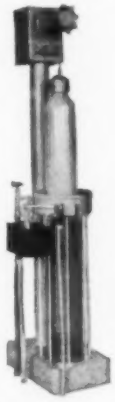
W&T CHLORO SCALE
Gives a continuous record of chlorine used

W&T CHLORO METER
For sterilizing small water supplies

THE LAVÉL PROCESS
For production of sodium hypochlorite sterilizing solutions at laundries, dairies, food establishments

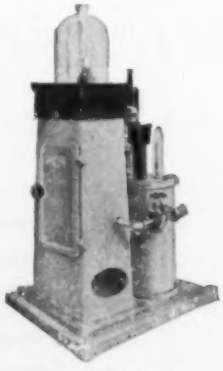


W&T CHLORO-CLOCK
Accurately applies chlorine solution for swimming pool sterilization

Chlorinators *for* Every Need

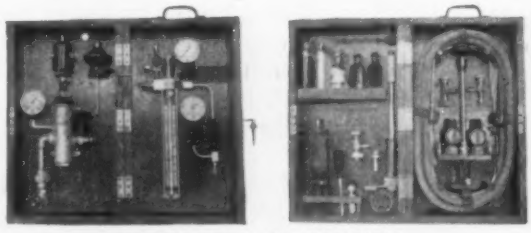
WATER STERILIZATION
SWIMMING POOL SANITATION
SEWAGE DISINFECTION
ODOR CONTROL
ALGAE ELIMINATION
WATER MAIN STERILIZATION
INDUSTRIAL WASTE TREATMENT
DAIRY SANITATION
BLEACHING SOLUTIONS

W&T MSP TYPE CHLORINATOR
For sterilizing water supplies in small communities and in swimming pools



W&T VACUUM TYPE ASV AUTOMATIC CHLORINATOR
Especially applicable for water and sewage sterilization where flow fluctuates widely

See them all at the **A. W. W. A. Convention** Toronto June 24th-28th



W&T WATER MAIN STERILIZER
A new portable chlorinating apparatus which every water works should have

"The only safe water is a sterilized water"

WALLACE & TIERNAN

COMPANY, INCORPORATED

Manufacturers of Chlorine Control Apparatus

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Sa-17

ALSO SEE OUR ADVERTISEMENT ON PAGE 12

TRADE "LEADITE" MARK

Registered U. S. Pat. Office

Eliminating Repairs and Maintenance Costs

TRENTON WATER WORKS, Trenton, N. J., has been using Leadite for making joints in c. i. bell and spigot water mains for a great many years with entire satisfaction.

They have laid nearly 75 miles of c. i. pipe of various sizes with Leadite joints.

Trenton has very good paved streets and they have never had to dig up a Leadite joint for repairs during all the time they have been using Leadite. They consider this excellent performance for Leadite joints.

They find the use of Leadite has reduced to a minimum repairs and maintenance costs.

Trenton Water Works has always found Leadite joints efficient and economical.

They keep a check on their distribution system by water waste surveys

During the severe winter of 1917-18 Trenton Water Works had over 2000 frozen services. Many of these services were connected to mains laid with Leadite joints. They had no difficulty in thawing, with electrical apparatus, services connected with main which were laid with Leadite joints.

Mr. Alvin Bugbee is Superintendent of the Trenton Water Works.

Specify and use **LEADITE** It saves at least 75%

Be sure it is **LEADITE** and accept no imitations

The pioneer self-caulking material for c. i. pipe
Tested and used for over 30 years

THE LEADITE COMPANY Land Title Building PHILADELPHIA, PA.

NO CAULKING

Why not remember to mention THE AMERICAN CITY?

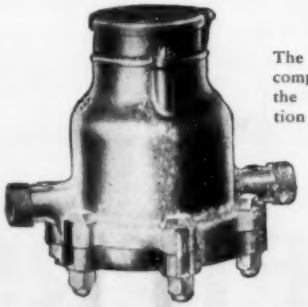
"No Admittance" *for the* Friction Twins

THE Friction Twins, Mechanical and Hydraulic, find it easy to get into most water meters to rob them of their efficiency and long life. But, to save their necks, they can't get into a Hersey Water Meter. At every turn they find the sign "No Admittance" against them.

The kinetically balanced piston of the Hersey Water Meter does away with the wear and tear of Mechanical Friction. No friction producing controls are needed to guide the Hersey Disc Piston in its circular path. The smallest flow turns the piston with ease.

Hersey Water Meters are of the direct flow type. The water makes few turns in passing in and out of the disc chamber. Hydraulic Friction and consequent loss of head are reduced to a minimum.

Long life, sensitivity, and high capacity are just three reasons why Hersey Water Meters are such high-grade revenue computers.



The Hersey Disc Meter is completely dipped-tinned, the best known protection against corrosion.

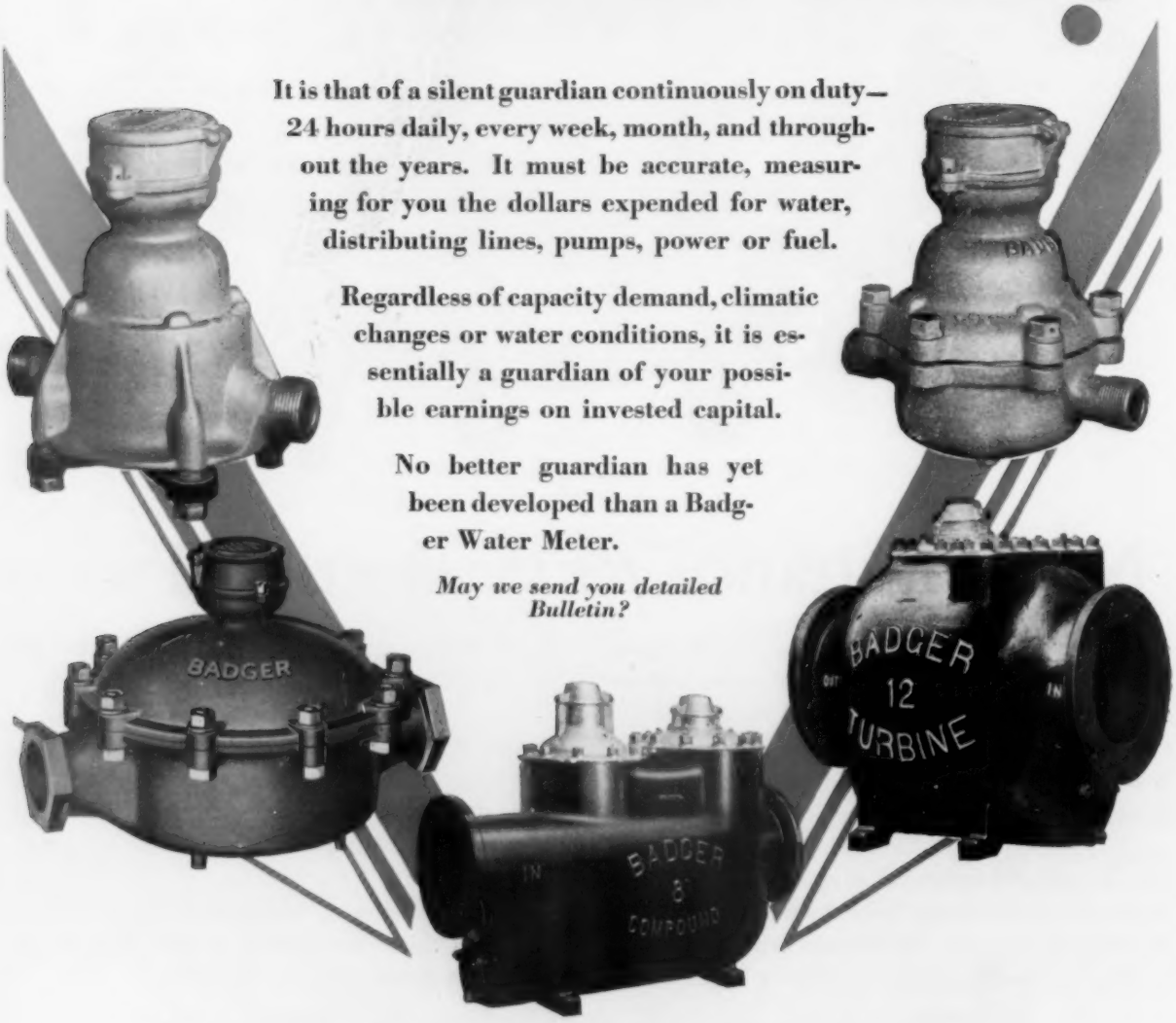
Hersey Manufacturing Company, South Boston, Mass.

HERSEY
WATER METERS

NEW YORK, N. Y., 290 Broadway
PORTLAND, OREGON, 475 Hoyt St.
PHILADELPHIA, PA., 314 Commercial Trust Bldg.
ATLANTA, GA., 510 Haas-Howell Building.
DALLAS, TEX., 2301 Griffin Street
CHICAGO, ILL., 10 So. LaSalle St.
SAN FRANCISCO, Cal., 690 Market St.
LOS ANGELES, Cal., 450 East Third Street

Main Office and Works: Corner E and 2nd Streets, South Boston, Mass.

WHAT is a Water Meter's Work?



It is that of a silent guardian continuously on duty—24 hours daily, every week, month, and throughout the years. It must be accurate, measuring for you the dollars expended for water, distributing lines, pumps, power or fuel.

Regardless of capacity demand, climatic changes or water conditions, it is essentially a guardian of your possible earnings on invested capital.

No better guardian has yet been developed than a Badger Water Meter.

May we send you detailed Bulletin?

BADGER METER MANUFACTURING CO.

MILWAUKEE, WISCONSIN

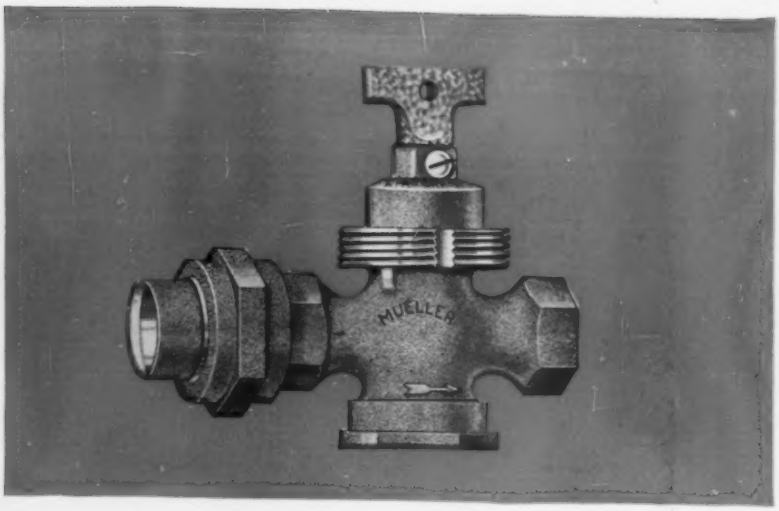
Branch Offices:
New York City Kansas City, Mo.
Cincinnati, Ohio

Branch Offices:
Los Angeles, Calif. Chicago, Ill.
Seattle, Wash.

BADGER Water METERS

Do you mention THE AMERICAN CITY when writing? Please do.

Mueller G-10300 Improved Extension Service Box—Minneapolis Pattern.



Mueller G-10215 Lead Flange Inverted Key Minneapolis Pattern Round Way Curb Stop.

Mueller Products Guard Connections from Main to Curb

Laboratory control of material through every stage of manufacture, careful workmanship, rigid inspection and a knowledge of water problems since 1857 have enabled Mueller to manufacture service giving products that guard the vital spots in connections from Main to Curb.

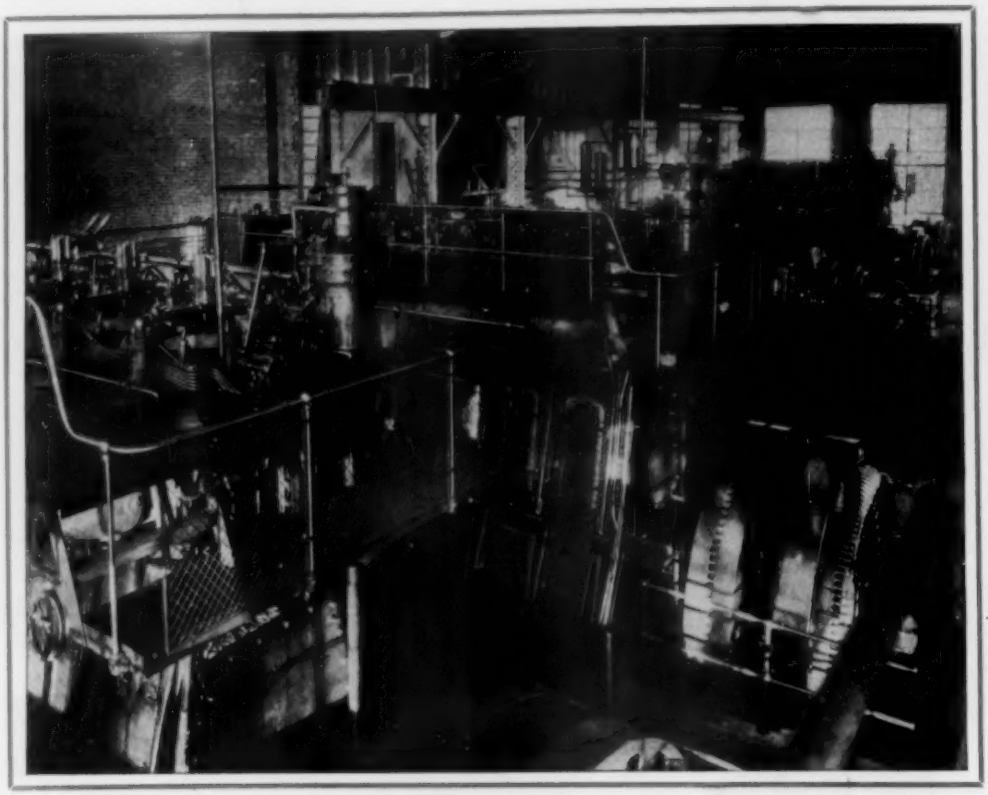
When you buy Mueller Curb Stops and Extension Service Boxes you are getting improved products that will do away with faults found in ordinary equipment and give permanent satisfaction.

That is why many of the largest water companies have used Mueller Curb Stops and Extension Service Boxes as standard equipment for years.

Send for your copy of the Mueller catalog.

MUELLER CO. (Established 1857) Decatur, Illinois.
Branches: New York, Dallas, San Francisco, Los Angeles.
Canadian Factory: MUELLER, Limited, Sarnia.

MUELLER



Freeport, N. Y., Municipal Water and Light Plant Now Installing 6th Busch-Sulzer Diesel—Total 5,665 b.h.p. Largest Municipal Diesel Plant in the United States.

America's Oldest Diesel Builders
31 Years Experience 1898-1929

BUSCH-SULZER

BUSCH-SULZER BROS.—DIESEL ENGINE CO.
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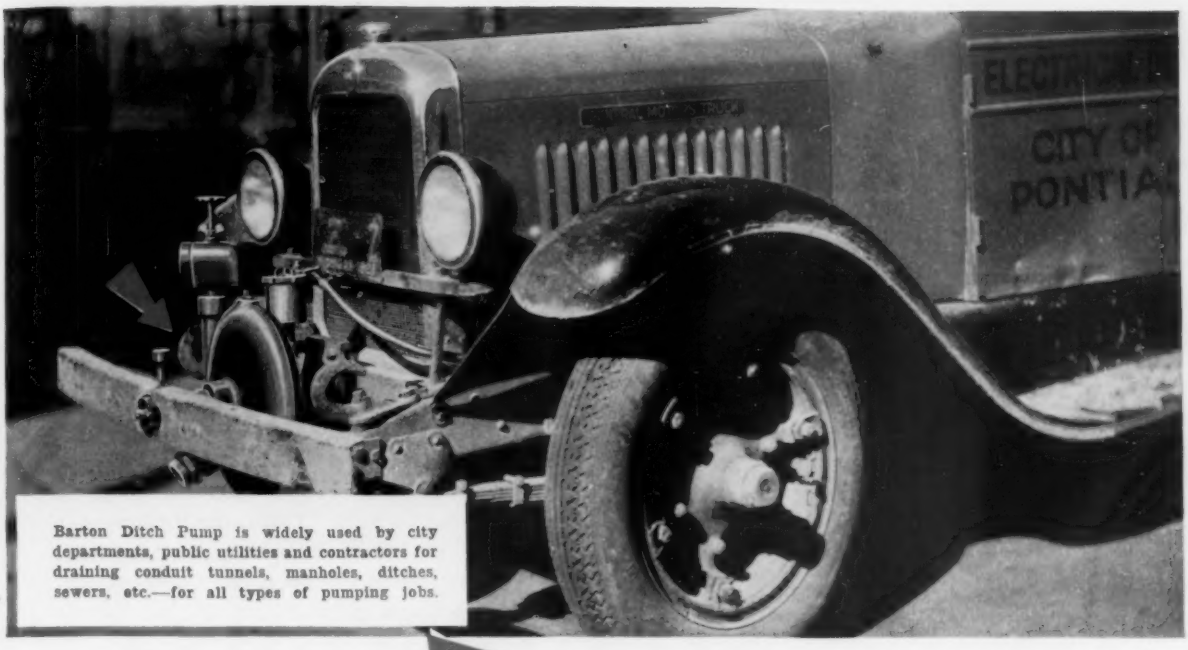

Barton Ditch Pump is widely used by city departments, public utilities and contractors for draining conduit tunnels, manholes, ditches, sewers, etc.—for all types of pumping jobs.

Saving Money in Both Drainage and Fire Service

HERE'S a development that every progressive municipal executive should know more about. In emergency drainage work, Barton Ditch Pumps save time and dollars—ready for immediate service anywhere, and low in price. In fire service, a Barton High Pressure Pump is adequate protection for the town or rural community at a fraction of former costs. Barton Pumps are AUTOMATICALLY PRIMED. They are mounted as shown and driven from the motor crankshaft through a patented power take-off of unfailing design. Any make of car, truck or tractor can be utilized.

Keep up with the times! Mail coupon today for full details.

AMERICAN STEAM PUMP COMPANY
BATTLE CREEK, MICHIGAN
Manufacturers of Steam and Centrifugal Pumps—Waterworks Pumps, Boiler Feed Pumps, Heating Pumps, Circulating Pumps, Etc.

BARTON
PORTABLE PUMP

Without obligation, send me full information on Barton ☐ Ditch ☐ Fire Pumps

Signed.....

Address.....

.....

Barton Fire Pump takes water from any source, lake, cistern, pond or city hydrant. Large capacity pump producing smashing pressures up to 200 pounds.

DID THIS PIPE NEED A CLEANING? I'LL SAY IT DID!

See, in the first picture, the torrent of muddy water pouring out of a 20-inch main, just before the pipe-cleaning machine came through! Second picture, the same pipe just after the machine came through. Third, the flushing out of the main immediately afterwards; and fourth, the pure, clean water gushing forth in full force!

THE NATIONAL METHOD

was the means employed to bring the pipe back to normal efficiency.

In the city where this job was done, incrustations and sediment had in some cases reduced the efficiency of the mains to as low as 23.5% of new pipe!

Ask us for the name of the city—then ask the Water Department of that city what they think of the National Method of Water Main Cleaning!

Possibly friction losses are reducing the flow in some of the mains in your city. If so, now is the time to investigate this matter of pipe-cleaning. We can furnish you some interesting facts. Just drop us a line.

The
NATIONAL WATER MAIN CLEANING COMPANY
Burt B. Hodgman, Chief Engineer
HUDSON TERMINAL BUILDING
NEW YORK

A recent shipment of 8 Western Hot Patch Portable Asphalt Plants leaving the factory for delivery to the City of Chicago.

Chicago *prepares to safeguard its pavements for another season*

THE shipment of Western Hot Patch Portable Asphalt Plants shown above indicates that Chicago realizes the importance of keeping the pavement surfaces unbroken. With an investment of millions of dollars to protect in its miles of boulevards, the City of Chicago, as well as various park systems in the city, has used Western Hot Patch Outfits for a number of years.

Authorities agree that a hot patch is the only lasting Patch. Western Hot Patch Portable Asphalt Plants combine in a single easily moved machine, material heating bins, fire box, tool heater and mixing pan.

The repair mix is made right on the job and put in hot! Lasting patches

Three or four men can operate the Western Hot Patch Outfit under the supervision of a foreman.

can be made in concrete, asphalt or brick pavements.

Repair costs on the machine itself are practically nothing because there are no moving parts to get out of order. Write for complete information.

The Austin-Western Road Machinery Co., 400 North Michigan Ave., Chicago, Illinois. Branches in principal cities.

Austin-Western
ROAD MACHINERY

"Most miles for your road dollars"

The HAND which Turns the Wheels of Industry

MOTORMEN step to their controllers—a city's street car system swings into movement. A switch is thrown in a nearby dairy—milk is purified. A baker moves a small lever—great ovens bake our bread. Factory whistles blow. Hundreds of switches are thrown. Giant looms begin to weave; a myriad of machines fashion our automobiles; turn out our shoes; provide lumber for our homes and furniture.

That is Electricity at work—the hand which turns the wheels of industry. The muscles and nerves of that hand are the miles of line equipment erected to bring electrical service to the consumer. Often these lines pass through main arteries or thickly populated districts where a pole of artistic design would be greatly appreciated.

For this purpose, Union Metal developed a heavy-duty Fluted Steel Pole of such strength that it carries satisfactorily not only distribution lines but also trolley span wires, traffic signals and ornamental lighting units where required. The fact that these Fluted Steel Poles have already been installed and approved in over thirty progressive cities* is an indication of how well beauty and utility have been combined.

We shall be glad to supply full information on the economies and artistic effects to be obtained from the use of Union Metal Fluted Steel Poles to business men, public utility or city officials.

Complete details of the installations in these cities will be supplied upon request.

THE UNION METAL MANUFACTURING COMPANY
General Offices and Factory, Canton, Ohio
Sales Offices—New York, Chicago, Philadelphia, Cleveland, Boston, Los Angeles, San Francisco, Seattle, Dallas, Atlanta

Distributors:
GENERAL ELECTRIC MERCHANDISE DISTRIBUTORS
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See the Union Metal Exhibit at the N. E. L. A. Convention, Booths 178 and 180, Atlantic City, June 3-7

UNION METAL
FLUTED STEEL
DISTRIBUTION AND TRANSMISSION POLES

The Most Important Development Ever Made in Traffic Control!

—ELECTRO-MATIC—
VEHICLE-ACTUATED
TRAFFIC DISPATCHING SYSTEMS

ELECTRO-MATIC Apparatus is not a new traffic light but an apparatus which operates any type of traffic light in accordance with the actual demands of traffic in the street.

ELECTRO-MATIC Traffic Control Systems are operated by the vehicles themselves. Automobiles passing over "vehicle sensitive" units in the pavement adjacent to the intersection govern the changing of signals. These units indicate the presence and movement of the vehicle and transmit this indication to a control mechanism. The impulse given by the moving vehicle does not switch the light but simply "asks" for it.

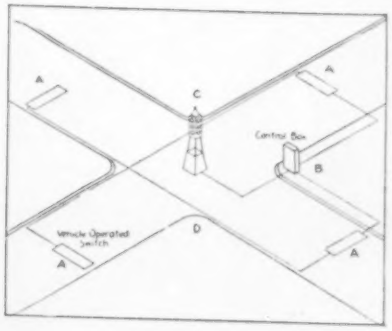
The control mechanism receives the impulse, records the presence and movement of the vehicle, and with complete knowledge of all approaching traffic that has arrived and is passing through the intersection, schedules the vehicle through.

Automobiles approaching an intersection when there is no traffic on the opposing street are given the green light instantly. No car is required to wait for more than a set maximum period against opposing traffic.

ELECTRO-MATIC Traffic Control Systems are equally serviceable in congested downtown business areas as well as isolated intersections.

ELECTRO-MATIC Control will pass more cars through an intersection per hour than any other type of control—either HUMAN OR MECHANICAL—and with greater safety.

Thoroughly proved in numerous installations under the most severe weather and traffic conditions.



Pavement units (a) which act as "eyes" and record the approach and presence of vehicles, transmitting this information to a control mechanism (b) which acts as a "brain" and with super-human intelligence operates the traffic signal (c) in accordance with the demands of the traffic flow.

SUPER-HUMAN
in
INCREASING SAFETY
DECREASING CONGESTION
ELIMINATING INCONVENIENCE
EXPEDITING TRAFFIC MOVEMENT
INCREASING STREET EFFICIENCY

WILMINGTON, DEL.—A completely coordinated system of ELECTRO-MATIC Controls handle the heavy traffic flow in the downtown business section.

BRISTOL, CONNECTICUT
ELECTRO-MATIC Apparatus will operate successfully under all weather and traffic conditions. Unaffected by snow, ice or rain.

EAST HARTFORD, CONN.—Intersection, taxing human facilities, easily handled by ELECTRO-MATIC Control. Traffic moving through much faster with less congestion.

AUTOMATIC SIGNAL CORPORATION
NEW HAVEN CONNECTICUT

Street Signs Assembly for installing on ornamental lamp standards. Sign plates are double-faced.

Traffic Signs for all purposes are made with CARVED IN letters, either luminous or non-luminous.

Signs that combine Beauty and Durability

YOU purchase LYLE Signs with the confidence it is only possible to place in a product thoroughly established and widely used. You know they will have the individuality and appearance that only a highly developed, exclusive, successful manufacturing method can produce, and that your buying judgment is backed up by nearly five thousand modern, progressive, American Cities.

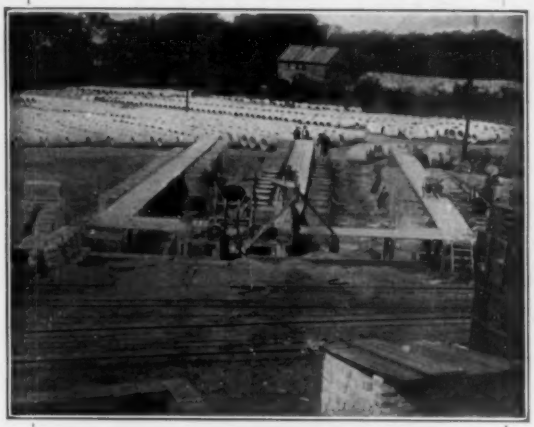
Send for 32 page Catalog.

LYLE - SIGNS

171 - 27th Avenue, S. E.
Minneapolis, Minn.

Newark
REINFORCED CONCRETE PIPE
"It makes a better joint"

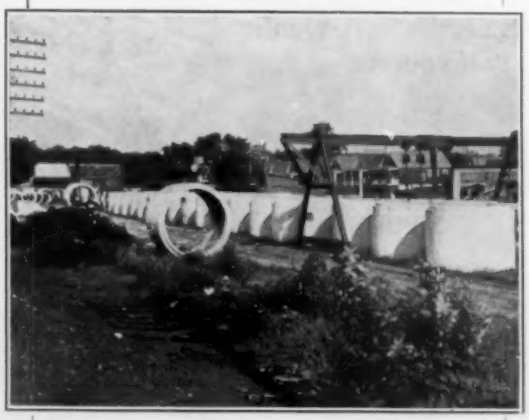
Easily laid at small expense with perfect flow line.



NEWARK CONCRETE PIPE COMPANY

462 Broad St.

Newark, New Jersey



DIETZ NO. 2 BLIZZARD
THE VETERAN HIGH GLOBE COLD BLAST LANTERN

THE bright red glow of Dietz Lanterns along the roadside insures the fullest measure of protection at lowest possible cost.

Dietz Lanterns shout "Danger" in every language. Everybody knows what they are and what they mean.

The Lantern illustrated, Dietz No. 2 Blizzard, meets requirements when the preference is for high-grade lanterns of large size and maximum lighting power. Made also with extra large oil fount.

Use RED! *No other color means danger*

R. E. DIETZ COMPANY
NEW YORK
Largest Makers of Lanterns in the World
FOUNDED 1840

DIETZ LANTERNS

Easier to Operate and Adjust Cheaper to Repair

The tractor-pulled PENNSYLVANIA "New" Fairway Quint or Trio shown above has fewer parts than any other mower of its type on the market and is, therefore, light in weight. Even the average tractor operator can make the simple adjustments, as well as any minor repairs.

The PULL-FRAME, attached to the tractor by a single bolt, as well as the WHEEL-TYPE UNITS and the CLOSELY-COUPLED FRAME AND UNITS, insure greater speed, better vision, easier steering and handling and better control.

Write for your copy of attractive, new catalog, illustrating and fully describing the "New" Fairway and all the other PENNSYLVANIA Quality mowers for public parks and golf courses.

PENNSYLVANIA LAWN MOWER WORKS
1650 North 23rd Street Philadelphia, Pa.

PENNSYLVANIA
Quality
LAWN MOWERS

THE worth of a water meter cannot be judged on one or two points of manufacture or operation.

The surest yardstick of such worth is its record of sustained accuracy in water measurement and its acceptance by the water works field.

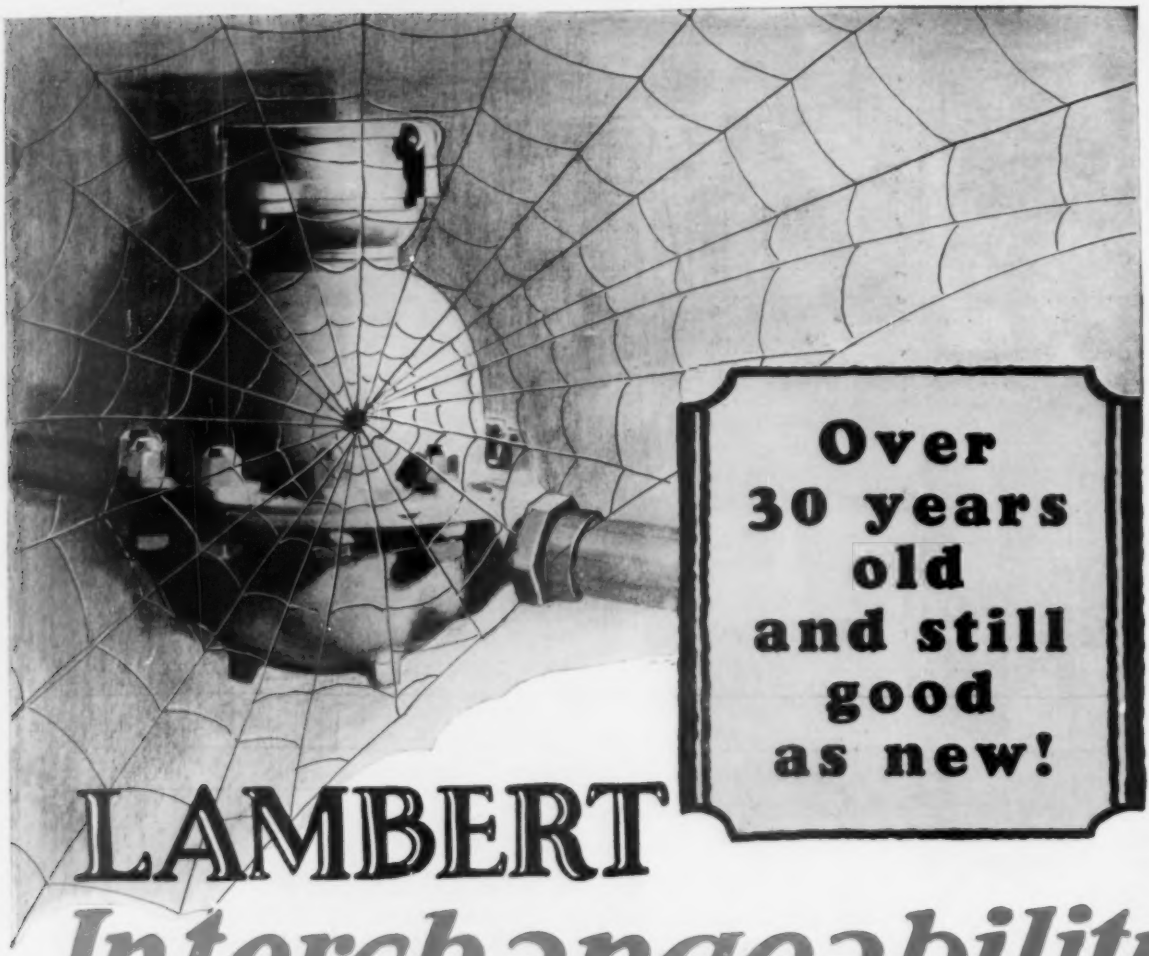
The purchase of Trident and Lambert Meters has set an unsurpassed record for steady growth—over 5,000,000 made and sold the world over—the truest indication of satisfactory, accurate, economical water-revenue production.

NEPTUNE METER COMPANY
THOMSON METER CORP.
50 EAST 42ND STREET NEW YORK CITY

Neptune Meter Co., Ltd., Toronto, Ont.

Pioneers in Meter Progress
Yesterday — TODAY — Tomorrow

Trident
& Lambert Meters
"The Cash Registers of the Water Works Field"



Over 30 years old and still good as new!

LAMBERT *Interchangeability*

means a meter that never wears out! For into the same *old* Lambert casing, after years of service, can be quickly inserted *new* interchangeable Lambert unit parts, without removing the meter from the line. During 1926-27-28, as many Lambert Meters were sold as in any other similar period of the Company's history.

[*Every One Knows the TRIDENT Meter Is Interchangeable*]

Cash Registers of the Water-Works Field

THOMSON METER CORPORATION

NEPTUNE METER COMPANY

50 East 42nd Street, New York City

Pioneers in Meter Progress
Yesterday TODAY Tomorrow

Soda Ash
Caustic Soda
Liquid Chlorine
Bleaching Powder
Bicarbonate of Soda
Modified Virginia Soda
Ammonia, Anhydrous & Aqua
H T H (Hypochlorite)
PURITE (Fused Soda Ash)
Sulphur Dichloride
Benzoyl Chloride
Benzoate of Soda
Benzyl Alcohol
Benzaldehyde
Ethyl Vanillin
Benzoic Acid
Coumarin
Vanillin

DEPENDABILITY

JUST as a lighthouse means safety and dependability to ships far out at sea, so does the Mathieson trade mark serve as a constant symbol of dependability for all purchasers of industrial chemicals...When thousands of dollars' worth of valuable material is at stake—when good results mean maintaining a good reputation—then the chemicals you employ must be unquestionably dependable. When you specify Mathieson products you have positive assurance that these chemicals are safe—uniform—dependable. Learn what a sense of security this dependability imparts by specifying Mathieson Chemicals.

The MATHIESON ALKALI WORKS (*Inc.*)
250 Park Avenue, New York City
Philadelphia Chicago Providence Charlotte Cincinnati
Works: Niagara Falls, N. Y. Saltville, Va. Newark, N. Y.
Warehouse Stocks at all Distributing Centers

MATHIESON CHEMICALS

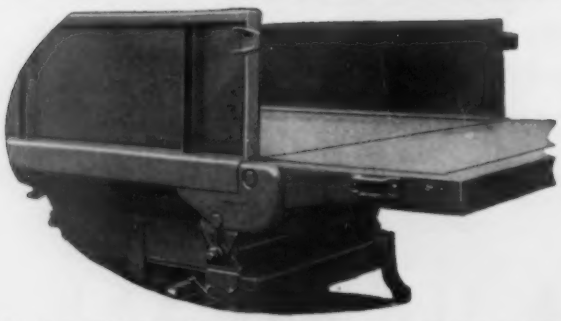
WHY WOOD HOISTS AND DUMP BODIES?

Because 18 years of practical experience in building dumping equipment for dump truck men has taught us how to built hoists and dump bodies to withstand the most severe service.

Wood All Steel Dump Bodies are reinforced at all points where greatest stress comes and vital parts are of drop forged steel—assuring solid satisfaction in performance and economy in operation.

Write for latest Catalog No. 10

Wood Hydraulic Hoist & Body Co.
Detroit U. S. A.



J-1 is a quick operating "all purpose" body. Tail gate and tail gate posts open level with floor, forming platform extension.

Are Your Push Brooms Ordered?

For Spring Street Cleaning
24-HOUR SERVICE
Refilling Your Street Sweeper Rolls
WE PAY THE FREIGHT
THE JOS. LAY COMPANY
1900 WAYNE AVENUE PORTLAND, IND.

HONHORST TAR HEATERS

"Built for service"

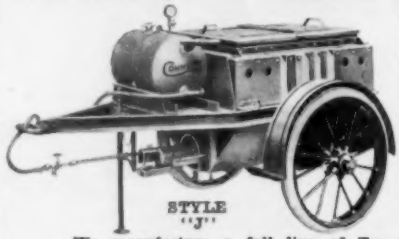
ALL STYLES
Portable and Stationary
25 to 200 gallons

See our page in Street Construction Section, Municipal Index, for the Kettle you need

Write for Pamphlet No. 15 on the New Oil Burning Heater

THE JOS. HONHORST CO.
1016 W. 6TH ST. CINCINNATI, O.

SPEED UP WORK BY USING



a Connery Style "J" oil-burning kettle. Here's a kettle that answers all requirements:—low fuel cost, quick heating, roller-bearing wheels and springs, absolute temperature control and solid rubber tires if desired.

We manufacture a full line of Tar and Asphalt Kettles, Oil Burning Kettles, Oil Burners, Torches, Pouring Pots, Hand Spraying Attachments, etc. Send for "Blue Book" describing our equipment.

Connery & Company, Inc.
4000 N. Second Street, Philadelphia, Pa.

SAVOY HOTEL—DETROIT

750 Quiet Restful Rooms Each with Bath

Single $2.50 to $4.00 per day
Double $4.00 to $5.50 per day

Sleeping rooms in the Savoy Hotel are correctt in appointments and invitingly spacious at a very moderate price. You may choose practically any sort of accommodatioon.

It's a Bad Hole but—

the Radiator wont bump!

The Bates Steel Mule

Models are designed so that crawlers protect the radiator. You can't nose into a bank and stick or disable the tractor.

Wide, generous crawlers extend the whole length of the chassis. This insures tremendous traction and radiator protection.

. . . And that's only one of the many points of "Steel Mule" superiority. Send for the complete story.

Clip the coupon for the Bates Tractor Book which gives complete, specific information that you should have on this line of sturdy, dependable tractors.

FOOTE BROS. PRODUCTS

Established 1859

FOOTE BROS. GEAR & MACHINE CO.
Road Machinery Division
231-35 No. Curtis St., Chicago

Sales and Engineering Offices in All Principal Cities, U. S. A., and Canada

This Book Describes the Bates "30", "40" and "80" "Steel Mule" Tractors.

A.C.D.-104

FOOTE BROS. GEAR & MACHINE CO.
231-35 N. Curtis St.
CHICAGO ILL.

Please send me copy of the Bates Tractor Book.

Signed_____

Address_____

6-20

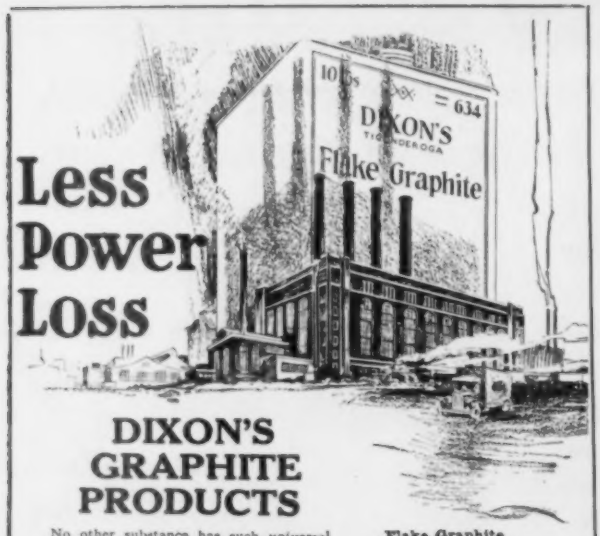
When you write for that catalog, kindly mention THE AMERICAN CITY.

Louisville's New Garbage Collectors

Now Louisville joins the ever-growing roll of American cities cutting garbage disposal costs by the use of Highway Trailers. Louisville officials are finding the city kept cleaner and more sanitary with a far lower investment and labor cost than under previous methods. Write for details about how Highway Trailers are saving money for municipalities in every part of the country—and how they will save money in your city.

HIGHWAY TRAILER CO.

EDGERTON, WISCONSIN.



Less Power Loss

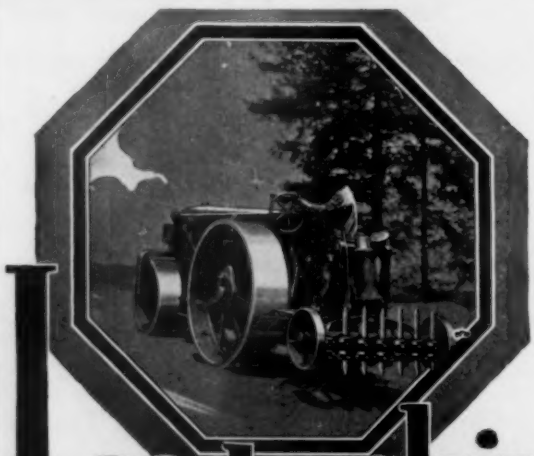
DIXON'S GRAPHITE PRODUCTS

No other substance has such universal application in preventing power losses as graphite and its products.
Dixon's Flake Graphite alone, or blended with oil or grease, prevents friction losses by producing dead, smooth bearing surfaces.
And Dixon's Graphite Seal and Pipe Joint Compound eliminates loss of power in generation and transmission by making threaded and gasket joints in cylinder heads, pipe lines, etc. absolutely tight.
We also produce Dixon's Boiler Graphite, which keeps boiler tubes clear and free of scale.
More than 100 years of experience in overcoming power losses by means of graphite is back of every ounce of Dixon's Graphite Products.

Flake Graphite
Boiler Graphite
Graphite Cup Grease
Waterproof Graphite Grease
Solid Belt Dressing
Pipe Joint Compound (insoluble in water)
Graphite Seal (insoluble in gas or oil)
Graphite Motor Brushes

Write for Bulletin 107C.

JOSEPH DIXON CRUCIBLE COMPANY
Established 1827
Jersey City **New Jersey**



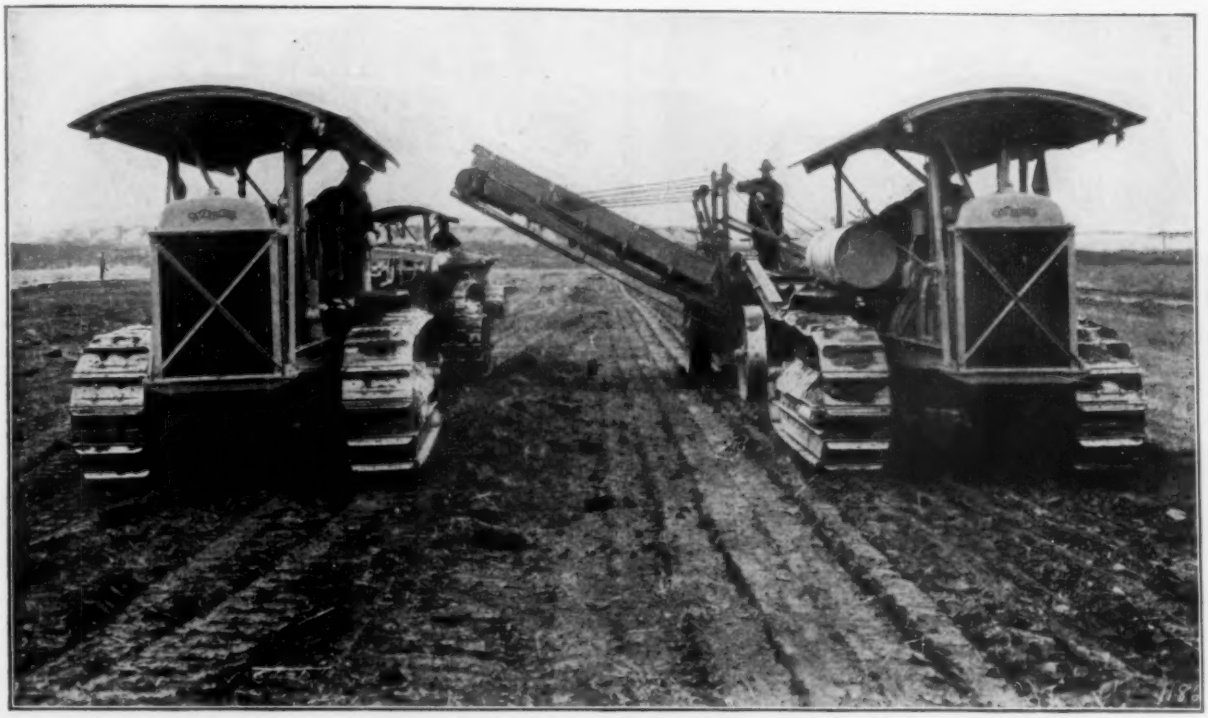
Leadership

It is to the men already using Buffalo-Springfield Rollers that we direct you for a frank, unbiased opinion of their practical worth. They, of all men, can best explain why the Buffalo-Springfield is, and long has been, the leader among road rollers.

Various models, steam and motor-driven. All practical sizes. Scarifier and other attachments when desired. Booklet upon request.

THE BUFFALO-SPRINGFIELD ROLLER CO.
Springfield, Ohio
Buffalo—Springfield Rollers

PLANTING A ROAD



A completely motorized job. One Sixty pulls a Russell elevating grader filling track-type dump wagons pulled by other "Caterpillar" Sixtys. The work *moves*. And when the road is finished these "Caterpillar" track-type tractors will maintain it—repair it in spring, clear it of snow in winter, pull the scraper, the scarifier—push the bulldozer or snow plow with sure-footed ease. Here is traction for soft spots and sand—power galore. There is a "Caterpillar" dealer near you. Ask him.

Caterpillar Tractor Co.
EXECUTIVE OFFICES: SAN LEANDRO, CALIFORNIA
Sales Offices: Peoria, Illinois • 50 Church St., New York • San Leandro, Calif.
Holt Combined Harvesters • Russell Road Machinery
"Caterpillar" Tractors

Prices—f. o. b. Peoria, Illinois

TEN	$1125	TWENTY	$1975
FIFTEEN	$1500	THIRTY	$2475
SIXTY	$4300		

CATERPILLAR
REG. U.S. PAT. OFF.
TRACTOR

Protect yourself!

with simple and direct

LIGHT

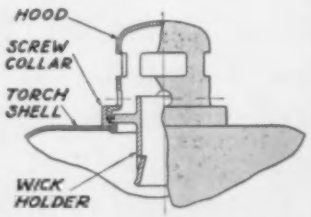
from a dependable source

in other words always use the

TOLEDO TORCH

PRETTY colored lanterns may get you by with cautious drivers, if you hire a watchman to keep them on the job. But it's the reckless ones who cause all the accidents. With them the use of uncertain signals, such as red lanterns, is a needless risk for you to take, especially when it is so much more costly than using TOLEDO TORCHES.

The New TOLEDO TORCH is dependable in all kinds of weather, is very economical in the use of fuel, and is never molested by petty thieves. The secret of its great success lies in the new ECONOMY BURNER. (Patents Pending)



IT is the only burner that will give you satisfactory service at all times. Observe carefully its construction, and *insist on having the genuine.* Similar looking imitations do not compare in performance.

Ask for the 'Champion'

"the harder it blows the better it burns"

Made only by

THE TOLEDO PRESSED STEEL CO.
TOLEDO, O.

PERHAPS *we can help you*

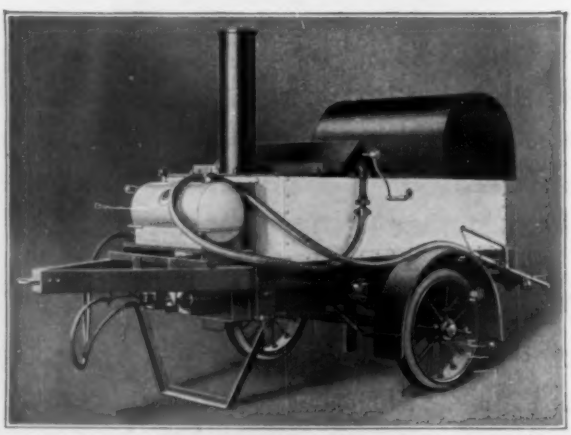
Do you ever get an idea that your highway department needs something different in the way of maintenance equipment?

You seem to know just about what is wanted, but you can't quite dope it out?

Then why not write to us? Our engineering department has had wide experience in designing tar kettles, crack fillers, surface heaters and the like. Bring your knotty problems to us. Perhaps we can help you out.

You know, of course, that we manufacture a complete line of road and street maintenance equipment. It is completely described in our Catalog D. If you haven't a copy, write for one, now.

This is our standard 300-gallon oil-burning Trail-O-Heater equipped with Hand Spray Attachment —ideal for penetration and skin patching.



LITTLEFORD BROS.,

500 E. Pearl St., Cincinnati, Ohio

LITTLEFORD
ROAD & STREET MAINTENANCE EQUIPMENT

LITTLEFORD KETTLES SINCE 1900

Where There's Work to Be Done CLETRAC Does It Profitably!

BIG loads—heavy pulling in mud and mire—narrow trails — steep grades — it makes little difference what the conditions are or how difficult the work when there's a Cletrac on the job. Here is power, sure and dependable for every power operation — ready to serve you *profitably* every day in the year.

If you do not know the notable work of CLETRAC Crawler Tractors — their remarkable ability to cut costs and speed up work on all road operations and contract jobs — mail the coupon or write, today, for the complete story.

Cletrac Offers a Complete Line from Which to Choose

There is a Cletrac model to economically fit every job — a size to meet every power need from the small jobs up to the very biggest. Cletracs are built in a complete line ranging from 12 horse-power to 100 horse-power.

The Cleveland Tractor Company

19326 Euclid Avenue, Cleveland, Ohio

The Cleveland Tractor Co., 19326 Euclid Ave., Cleveland, O.
Send full details of Cletrac for industrial work.

Name _____

Address _____

_____

MODERN METHODS

demand the use of Mechanical Spreading

Resulting in INCREASED EFFICIENCY, LABOR AND MATERIAL SAVED, BETTER WORK AND LONGER SURFACE WEAR. A GOROCO SPREADER will accomplish this for you at less cost than any other type of spreader. It attaches to any truck, spreads in advance of itself over slippery surfaces, fresh road oils, asphalts and tars, with instant control of quantity and of width spread. Does the work of 20 men in 10 hours. Absolute satisfaction guaranteed.

GOROCO MECHANICAL SPREADER CO.

Upper Darby Post Office **Philadelphia, Pa.**

For General Service

Insist on Haiss Portable Belt Conveyors

As a general utility machine for loading sand, gravel, coal, coke, cinders, stone and other loose materials there's nothing more economical in first cost than a portable belt conveyor. And for "last costs," nothing beats the Haiss machine. It's a quality product with a heavy belt, an excellent two cylinder engine or a standard electric motor. It has *ball bearing* belt rollers and similar high class refinements throughout.

May we send you our latest belt conveyor catalog? A postcard will bring instant response.

Write for Catalog No. 1127

George Haiss Manufacturing Co., Inc.
142nd St. and Park Ave. New York, N. Y.
Built by the makers of Haiss Loaders, Excavators and Clamshell Buckets

ON ROAD WORK

AND PICK-AND-SHOVEL JOBS

NELSON K-2 LOADER

Moves itself,—no dragging around.
Feeds itself,—no hand shoveling.
And one man runs it.

Does the work of twenty shovelers and never gets tired.

Low price. Economical to run and built to give years of service.

N. P. NELSON IRON WORKS, Inc.
822 Bloomfield Ave. Passaic, N. J.

The Breakers

On the Boardwalk,
Atlantic City, N. J.

Preferred—

In all seasons by those who know and wish the best upon either the American or European Plan. Sensible rates withal!

Hillman Management

Outstanding Features of the Chevrolet Six Cylinder Trucks

for Economical Transportation

CHEVROLET

1 SIX-CYLINDER PERFORMANCE

Powered by a rugged six-cylinder valve-in-head engine—Chevrolet trucks provide remarkable smoothness, flexibility and acceleration—even when hauling a capacity load.

2 AMPLE CAPACITY

A longer, stronger, heavier frame makes possible the mounting of any body type, with loading space up to 9 feet in length and a gross load limit of 7000 lbs.

3 OUTSTANDING ECONOMY

Improved carburetion and a new high-compression, non-detonating cylinder head provide gasoline economy which is actually as great as that of a four-cylinder truck.

4 DAY-AFTER-DAY DEPENDABILITY

Numerous notable mechanical advancements, combined with extraordinary staunchness of construction, make the new Chevrolet six-cylinder trucks unusually dependable.

5 SMART APPEARANCE

A wide array of body types not only meets every haulage and delivery requirement—but provides unusually smart appearance and the utmost convenience.

Public Officials know—

—that the swift pace of today's traffic conditions demands the increased power, speed, flexibility and acceleration of a six-cylinder engine. And because the new Chevrolet trucks provide this six-cylinder performance *with the economy of the four*, their popularity is growing by leaps and bounds in every section of the country.

Visit your Chevrolet dealer today and see how completely the new Chevrolet trucks meet the requirements of *your* business. In performance, in convenience and in handling ease—they will prove a revelation. And they are as economical, both to own and to operate, as any truck you could buy.

CHEVROLET MOTOR COMPANY, DETROIT, MICH.
Division of General Motors Corporation

The Sedan Delivery.. $595 The Light Delivery Chassis $400 The 1½ Ton Chassis..... $545 The 1½ Ton Chassis with Cab $650

All prices f. o. b. factory, Flint, Michigan

-A SIX IN THE PRICE RANGE OF THE FOUR

West approach of Main Street Bridge, Green Bay, Wis., an old concrete highway being resurfaced with Trinidad Native-Lake Asphalt. Binder laid in the morning, top in the afternoon, and opened to traffic at 7 P. M.

Laid and opened to traffic the same day!

For resurfacing brick, macadam, concrete, or stone pavements, Trinidad Native-Lake Asphalt makes a new street at about half the usual cost. And it is economical in service—lasts longer and costs less to maintain than any other bituminous paving material.

Trinidad Native-Lake Asphalt — nature's unequaled wear and weather resister — has been famed the world over for a half-century. Little wonder then that Trinidad was chosen for this Green Bay pavement—for the traffic of nine different state and county highways is routed over this bridge.

Other advantages of Trinidad pavements are attractiveness, resiliency, freedom from noise, ease of keeping clean and in repair.

For *road* building, Bermudez Road Asphalt —another native-lake asphalt—has demonstrated its outstanding merit. Interesting data on request.

The Barber Asphalt Company

New York Philadelphia Chicago
Pittsburgh St. Louis Kansas City San Francisco

TRINIDAD
LAKE ASPHALT

BAKER

Better Equipment

For Snow Removal
Earth Moving
Road Maintenance

It pays to select dependable equipment with a long record for good service such as

Baker Truck & Tractor Snow Plows
Baker Maney Self-loading Scrapers
Baker Automatic Rotary Scrapers
Baker Road Maintainers
Baker Bulldozers & Backfillers

Write for Special Bulletins

The Baker Manufacturing Company

503 Stanford Ave. **Springfield, Ill.**

Look for this trademark on every bale:—

FAULTLESS FIBER
HUNTSVILLE
HICKORY
FOR STREET SWEEPERS

LIVE
SPRINGY
FLEXIBLE

Take a bunch of Huntsville fiber—tie it in a hard knot!

Does it break? No!

Give it the hardest kind of service in your street brooms—against the heaviest refuse—and the roughest pavements—*does it stand up?* I'll say it does!

If you could see our "Shake Room," where every bundle of fiber is thoroughly shaken and beaten to eliminate all imperfect pieces—you would understand *why!*

Write for your copy of "The Story of Huntsville Hickory."

HUNTSVILLE FIBER & VENEER WORKS

FRANK H. FORD, President
HUNTSVILLE, ALA.

The Good Roads Machinery Co. Inc.

CHAMPION

COLD APPLICATION OLD DISTRIBUTORS

Especially constructed for the application of the lighter road oils, requiring no preheating.

Adaptable for mounting on small capacity high-speed trucks.

An ideal Distributor at an attractive price for any Contractor, Municipality, County or State Roadway Department.

Standard Sizes
500 gallon **600 gallon**

Adaptable to mounting on any standard truck chassis of sufficient capacity equipped with power take-off attachment.

Ask for Bulletin KCO

At Left—CHAMPION COLD OIL DISTRIBUTOR ON GRAHAM 3-Ton High Speed Chassis—Model RES.

CHAMPION BITUMINOUS DISTRIBUTORS
(Heater Type)

Champion Bituminous Distributors are especially designed and constructed for the application of the heavy asphalts and tars, where heating of the material and its application under pressure is necessary.

Built in three standard sizes, 600-, 800-, and 1000-gallon tank capacity. Single or double unit type. Adaptable to mounting on any standard truck chassis of sufficient capacity.

CHAMPION DISTRIBUTORS possess many features that will be appreciated by the users of such equipment. Catalog KBD describes them in detail, and contains much useful data. Ask for it.

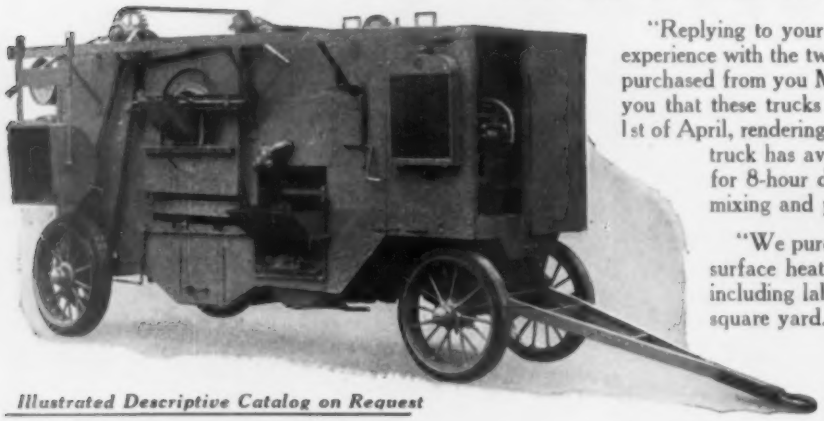
Below—CHAMPION BITUMINOUS DISTRIBUTOR—Model Y-79 Type PT. on MACK TRUCK—(Single Unit Machine).

SALES BRANCHES
PHILADELPHIA WATERTOWN, MASS. NEW YORK
PITTSBURGH CHICAGO LOS ANGELES
DISTRIBUTORS IN PRINCIPAL WESTERN CITIES

Good Roads MACHINERY

Washington, D. C., Repairs Its Streets with Two Chausse Portable Asphalt Plants

Read This Letter from Capt. H. C. Whitehurst (9/12/28)



"Replying to your inquiry of recent date concerning our experience with the two Chausse asphalt trucks, Model E-3, purchased from you March 1, 1928, I am pleased to advise you that these trucks have been in continuous use since the 1st of April, rendering efficient and economical service. Each truck has averaged slightly in excess of 150 cu. ft. for 8-hour day at a cost of 56c per cu. ft. for the mixing and placing of the material.

"We purchased at the same time two burners for surface heating and these have operated at a cost, including labor and oil, of approximately 7½c per square yard.

"The outfits are operated in the capacity of patrol units on our main thoroughfares and have fulfilled in every way the service for which they were intended."

Illustrated Descriptive Catalog on Request

Other Chausse Products—Oil Burning Fire Wagons, Surface Heaters, Tar Kettles, Torches

Chausse Oil Burner Company

1227 West Beardsley Ave. Elkhart, Indiana

"HVASS" STREET FLUSHERS

CLEAN STREETS IN THE MOST EFFICIENT ECONOMICAL AND SANITARY MANNER BY USING "HVASS" FLUSHERS

MOTOR TRUCK—SEMI-TRAILER—FOUR WHEEL TRAILER FLUSHERS OF 600 TO 3000 GALLONS CAPACITY TO SUIT ANY MUNICIPAL BUDGET

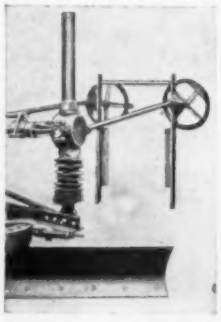
MANUFACTURED BY

CHAS. HVASS & CO., Inc.

OFFICE—508 EAST 19TH ST. *EST. 1872* NEW YORK CITY, N. Y.

Warco Products
do the job. easily.. quickly..efficiently.

FEW of us work for the love of the work alone . . . most of us cannot afford to put in our time just for the fun we get out of it . . . the job must put money into our pockets if we are to continue in business.



The Warco Screw Lift— "Built like a Screw Jack"

Spinning the freely turning wheels in the cab, operates the screw lift through the circle controls and easily raises and lowers the grader blade.

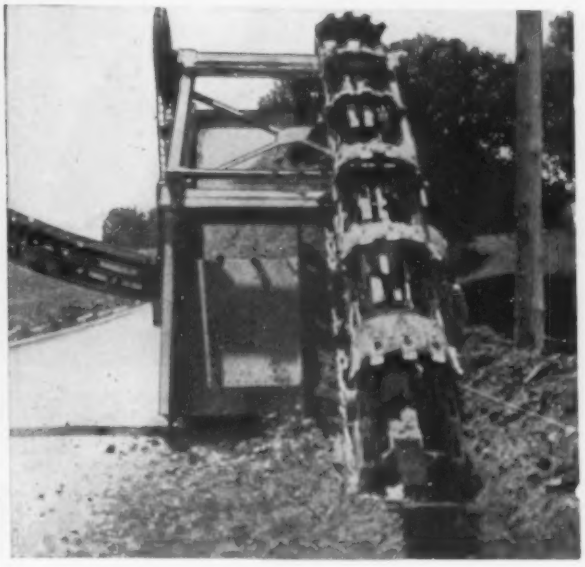
Dependable under all conditions, WARCO road machinery enables you to make money on any road building or earth moving job . . . *and get fun out of doing it!*

[Interesting new bulletins are yours for the asking—let us send them to you with the name of our distributor in your vicinity.]

WARCO PRODUCTS

W·A·RIDDELL COMPANY
BUCYRUS·OHIO·U·S·A·

The All-around Trencher



especially suited to city work

STRONG enough for big drainage or box sewer jobs—fast enough for rush subdivision trench—yet small enough to put pipe or conduit trench right through built-up streets, because of the patented offset boom that digs right past poles, or other obstructions—no wonder the Parsons 31 is called "the all-around trench machine," and is particularly suited for cities that want one machine to handle a wide range of work.

THE PARSONS COMPANY
Newton, Iowa
Division of National Equipment Corporation

PARSONS

A complete line of trenchers and backfillers

The Parsons Company, Newton, Iowa AC 6
Please send complete information on Parsons machines to handle trench about.....inches wide and.....feet deep.

.....

.....

Massachusetts State Highway, Boston to Newburyport. Asphalt Macadam construction with SOCONY Asphalt Binder in 1923. This view taken in October, 1928, after carrying heavy traffic for five years without repairs or resurfacing.

Standard Asphalt Products

Standard Asphalt Binder A
for surface treatment

Standard Asphalt Binder B
for penetration work

Standard Asphalt Binder C
for the mixing method

Standard Asphalt Joint Fillers
for brick or black pavements

Standard Cold Patch Asphalt
for repairing all types of Bituminous road surfaces

Standard Refined Asphalt
(Socony Brand)
for sheet asphalt paving

Standard Paving Flux,
Bridge Asphalt and
Preserving Oils

Specifications and all other particulars furnished on request

SOCONY
ASPHALTS AND ROAD OILS

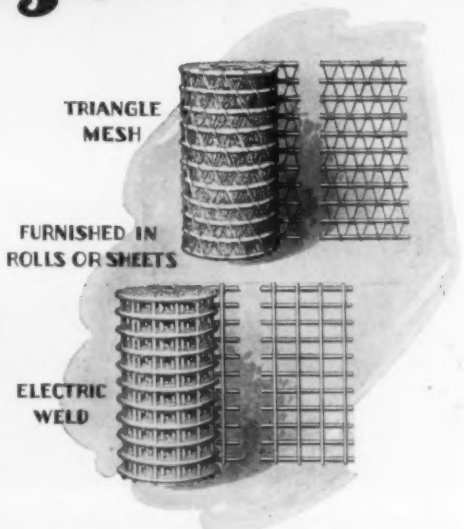
STANDARD OIL COMPANY OF NEW YORK, 26 BROADWAY

AMERICAN STEEL & WIRE COMPANY

Also Defends Brick and Asphalt Streets Against Time and Traffic

An asphalt or brick pavement is no stronger than its base.

It is an established fact that *"Steel reinforcement tends to hold fragments of cracked slabs together and thus reduces the extent of spalling and faulting in pavements. Also, it serves to prevent progressive breaking down of pavements under loads."



Extensive surveys and years of experience also show the necessity of reinforcing the Concrete pavement base of asphalt and brick pavements with wire fabric reinforcement. American Steel & Wire Company Wire Fabric is made of cold drawn steel and provides the most effective and economical distribution of metal.

Full information on building streets for permanence will be gladly sent on request.

*Report of Sub-Committee on Sub-grades and Pavement Bases by C. A. Hogentogler, Chairman, Senior Engineer, U. S. Bureau of Public Roads. American Road Builders Convention January 15, 1929.

American Steel & Wire Company

Subsidiary of United States Steel Corporation

208 S. La Salle Street, Chicago — 30 Church Street, New York

Other Sales Offices: Boston Cleveland Worcester Philadelphia Pittsburgh Buffalo Detroit Cincinnati Baltimore Wilkes-Barre St. Louis Kansas City Minneapolis – St. Paul Oklahoma City Birmingham Atlanta Memphis Dallas Denver Salt Lake City

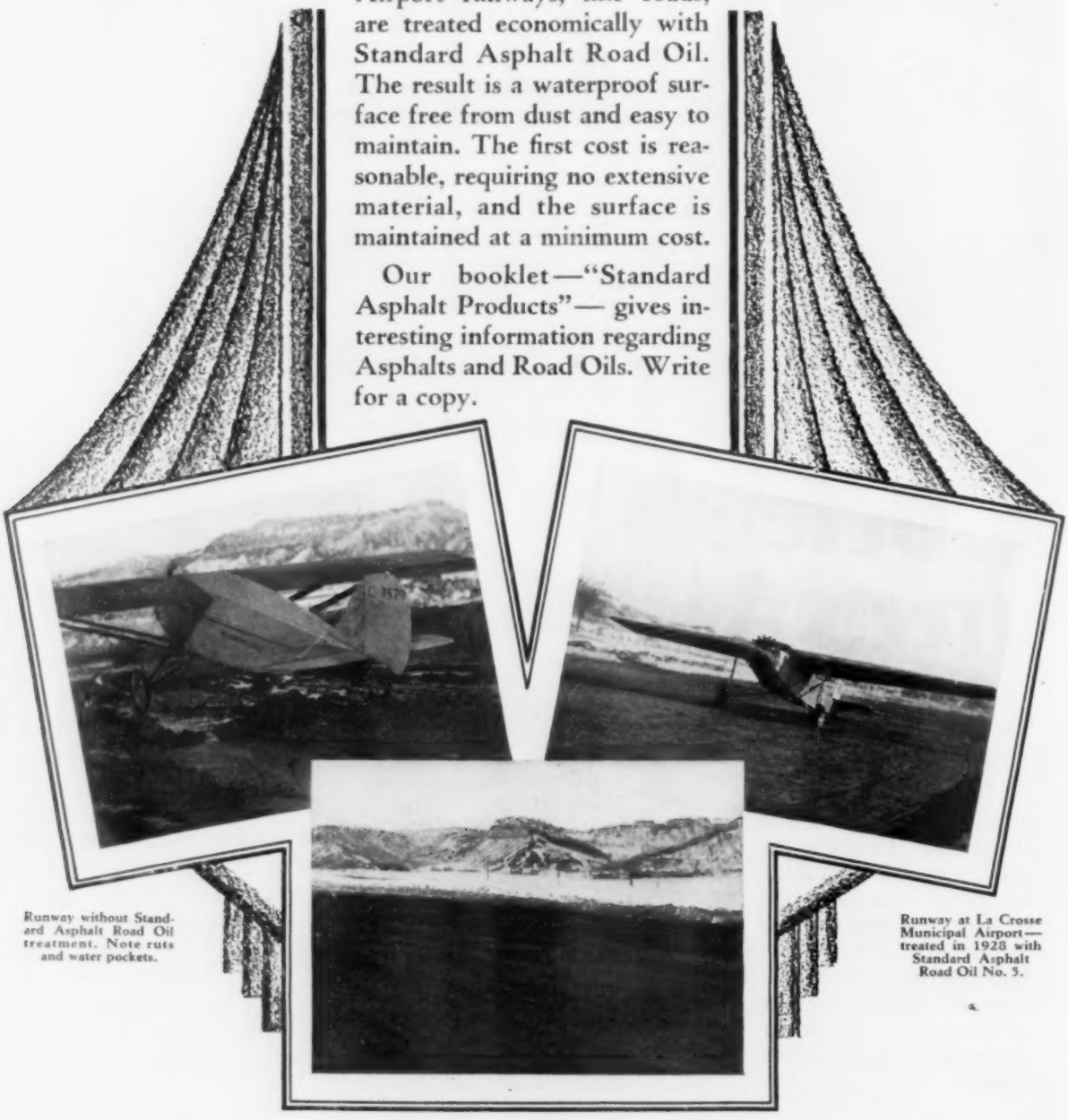
U. S. Steel Products Company: San Francisco, Los Angeles, Portland, Seattle *Export Distributors:* United States Steel Products Co., 30 Church St. New York

During June we hope you will remember to mention THE AMERICAN CITY

AIRPORT RUNWAYS TREATED WITH STANDARD ASPHALT ROAD OIL

Airport runways, like roads, are treated economically with Standard Asphalt Road Oil. The result is a waterproof surface free from dust and easy to maintain. The first cost is reasonable, requiring no extensive material, and the surface is maintained at a minimum cost.

Our booklet—"Standard Asphalt Products"— gives interesting information regarding Asphalts and Road Oils. Write for a copy.



Runway without Standard Asphalt Road Oil treatment. Note ruts and water pockets.

Runway at La Crosse Municipal Airport—treated in 1928 with Standard Asphalt Road Oil No. 5.

Note smooth surface with complete absence of ruts, holes and water pockets.

STANDARD OIL COMPANY (*Indiana*)

General Offices: 910 S. Michigan Ave. CHICAGO, ILLINOIS

ILLINOIS	INDIANA	IOWA	MICHIGAN	WISCONSIN	MINNESOTA	MISSOURI
Chicago	Evansville	Davenport	Detroit	La Crosse	Duluth	Kansas City
Decatur	Indianapolis	Des Moines	Grand Rapids	Milwaukee	Mankato	St. Joseph
Joliet	South Bend	Mason City	Saginaw	Green Bay	Minneapolis	St. Louis
Peoria	KANSAS	Sioux City	S. DAKOTA		N. DAKOTA	
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218

REG. U.S. PAT. OFF.
TONCAN
COPPER
Mo-lyb-den-um
IRON

Time-tested Toncan Is Safest

You can't afford to replace culverts in such places as this

WHEN a heavy fill overlies a culvert you need to be sure that

1. The culvert is structurally safe.
2. That its composition gives guaranty of long life.

Toncan Iron culverts have a flexibility that permits adjustment to shifting soil loads. They won't crack nor break and their life therefore depends upon the life of the material of which they are made.

Herein lies the greatest advantage of Toncan Iron culverts. Toncan Iron has been proven by thousands of tests and in hundreds of different industrial applications to have the greatest resistance to corrosion of any culvert metal. Toncan Iron has the natural corrosion-resistance of refined iron fortified by the addition of Copper and Molybdenum. You can depend on its lasting qualities.

TONCAN CULVERT MANUFACTURERS' ASSOCIATION, MASSILLON, OHIO

The Canton Culvert & Silo Co. Canton, Ohio
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The Berger Manufacturing Co. Minneapolis, Minn.
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Tri-State Culvert Mfg. Co. Memphis, Tenn.
Tri-State Culvert Mfg. Co. Atlanta, Ga.
The Firman L. Carswell Mfg. Co. Kansas City, Kansas
Wheat Culvert Company, Inc. Newport, Kentucky
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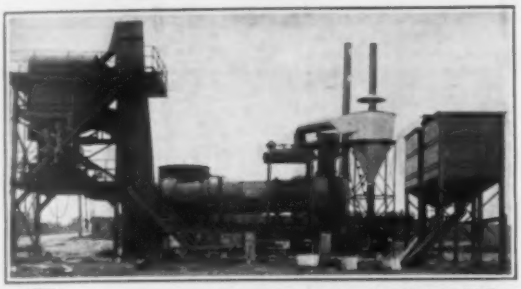

STATIONARY ASPHALT PLANT

Capacity 3000 square yards

This plant with its capacity for manufacturing 3000 square yards of 2-inch sheet asphalt per day of 10 hours, can at all times be depended upon to supply a surplus of uniformly heated material.

Specifications

Dryer—66 in. diameter x 24 in: long, oil-burning, internally heated type with individual motor drive

Hot Material Elevator—of the chain and bucket type complete with dust-tight steel casing, head chute and charging boot

Hot Material Storage Bin—capacity 30 cubic yards, constructed of sheet steel and provided with a dust-tight sheet metal cover; bin equipped with partitions to provide one, two, three or four compartments, each with overflow outlet and swing-cut-off discharge gate

Rotary Screen

Multi-Beam Scale—not less than five beams calibrated

Weigh Box—gravity-fed, gravity-discharged

Mixer—Steam-jacketed twin-shaft pug mill type with a mixing capacity of 2000 pounds

Mixer Platform—a heavy platform provided around three sides of the mixer; all levers for operating bin gates, clutches, etc., are located within easy reach of the platform man

Transmission, etc.—plant drive by means of machine-molded steel gears; all sprockets with chilled rims; all bearings extra heavy babbited, except those specified

Melting Kettle—steam melting type with capacity for melting at least 9000 gallons of asphalt

Burners—two No. 2 W. N. Best high-pressure burners (using steam for atomization) together with a ¾-in. W. N. Best oil-regulating cock or any other approved type

Asphalt Weigh Bucket—standard swinging type of sheet steel, suspended on a two-beam scale and provided with proper trolley and trolley beam

Exhaust Fan—one standard reversible mill exhauster, equipped with rubber-bushed flexible coupling complete with 15-hp. motor 860 r.p.m. with starter

Dust-Collector—one No. 22 extra heavy, having a shell 88-in. in diameter, fully equipped

In addition to items specified, we also furnish and install any necessary auxiliary equipment, such as storage tanks, boilers and pumps.

We also manufacture standard portable and stationary plants of the following sizes: 450, 850, 1500 and 2000 square yards 2-inch top per day. Write for our circular.

CHARLEROI IRON WORKS

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Eliminate the Hazard of Liability

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"CLEVELAND"

STEEL BARRICADE SUPPORTS

Painted red—Height 30 in.—For 2 x 6 stringer.
Ruggedly constructed, self-locking, cannot wobble.
Assembled and dismantled easily by one man.
Heavy enough to withstand high-wind pressure.
Placed anywhere on stringer, cleats eliminated.
Initial cost is only cost—repairing eliminated.

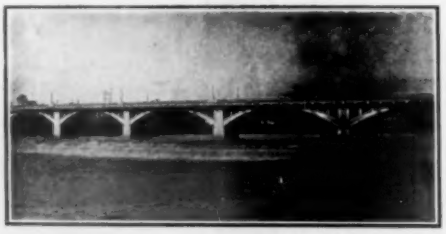
When your wood supports need replacement or repairs get CLEVELAND STEEL BARRICADE SUPPORTS. They are PERMANENT EQUIPMENT and a REAL ASSET.

Used by cities of Philadelphia, Pittsburgh, Detroit, and Cleveland, Warren Bros., R. F. Conway Co., J. A. Mercier Co., and hundreds of others.

If your dealer cannot supply you write us direct

THE CLEVELAND STEEL SPECIALTY CORP.

6602 Park Ave. Cleveland, Ohio



SEALTIGHT MEANS PROTECTION

The best argument for insurance is the maximum protection for a minimum expenditure.

SEALTIGHT products give maximum protection at low rates to both consumer and contractor.

These products are the "go between" that take the abuse. Use SEALTIGHT on your next job for insurance.

PRODUCTS—Expansion Joints Rail Filler
Protection Planks Crossing Planks
Bridge Flooring Industrial Flooring

Address Inquiries on Rail Filler' Protection Planks, Crossing Planks, Bridge Flooring, Industrial Flooring to our agents.

The Universal Asphalt Plank Co.
5 N. LaSalle Street
Chicago, Ill.

W. R. MEADOWS, Inc.

ELGIN, ILL.

Make the Job right—use "Sealtight"

Dowflake Gives the Lasting Effect of a Gentle Rain

Some of your maintenance problems would be over if it would only rain at convenient times—or if the effects of a good rain were lasting.

Dowflake gives the lasting effects of a gentle rain. This clean, odorless, non-tracking flake absorbs moisture from the air as soon as applied to the surface of a gravel road. It holds this moisture for months—keeps roads dust-free—permits shaping up at any time—makes road maintenance easier.

Moist, firm, dustless, Dowflake roads gain public appreciation. Hundreds of highway officials who control dust with Dowflake have won the whole-hearted approval of motorists and taxpayers alike, for Dowflake eliminates dust efficiently—and inexpensively.

Try Dowflake on your gravel roads. Write for our free book "How to Maintain Roads".

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN
Branch Sales Offices

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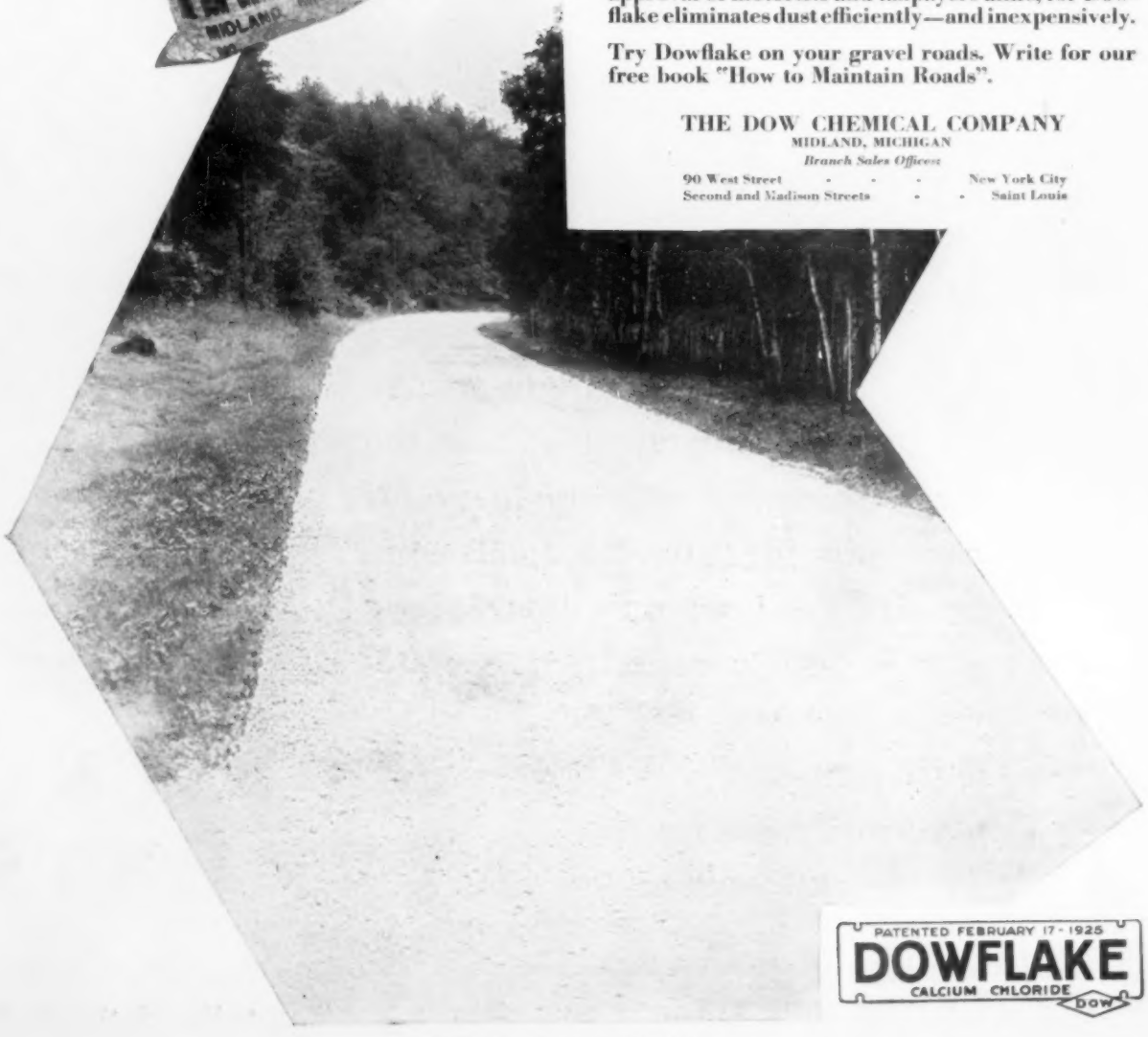


PATENTED FEBRUARY 17 - 1925
DOWFLAKE
CALCIUM CHLORIDE
DOW

THE SMALL VILLAGE ALSO WELCOMES IT!

VITRIFIED brick pavement, in ever-growing demand for the large cities and main highways, is especially ideal for the small community. For it not only assures long service with practically no maintenance, but it requires neither a highway organization nor expensive facilities.

Rosehill Avenue, one of the beautiful residential sections of Cincinnati. Aside from long life and low cost, brick pavements add charm and individuality to any community. For further information on brick pavement address, National Paving Brick Manufacturers Association, National Press Bldg., Washington, D.C.

vitrified BRICK PAVEMENTS

FACE THE FUTURE • PAVE WITH BRICK

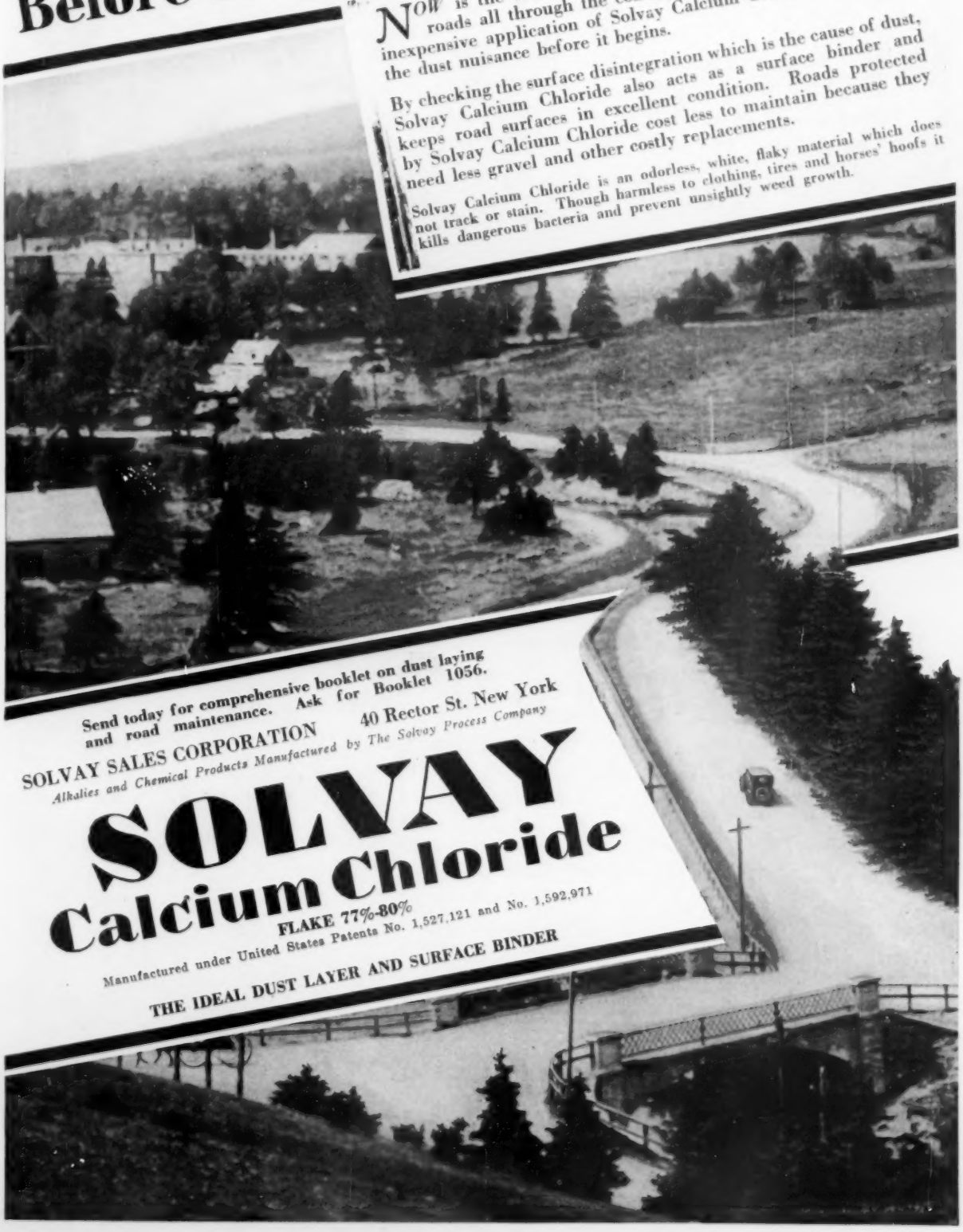
Do you mention THE AMERICAN CITY when writing? Please do.

End the Dust Nuisance Before It Begins ....

NOW is the time to make certain of maintaining dustless roads all through the coming outdoor season. The easy, inexpensive application of Solvay Calcium Chloride *now*, ends the dust nuisance before it begins.

By checking the surface disintegration which is the cause of dust, Solvay Calcium Chloride also acts as a surface binder and keeps road surfaces in excellent condition. Roads protected by Solvay Calcium Chloride cost less to maintain because they need less gravel and other costly replacements.

Solvay Calcium Chloride is an odorless, white, flaky material which does not track or stain. Though harmless to clothing, tires and horses' hoofs it kills dangerous bacteria and prevent unsightly weed growth.



Send today for comprehensive booklet on dust laying and road maintenance. Ask for Booklet 1056.

SOLVAY SALES CORPORATION 40 Rector St. New York

Alkalies and Chemical Products Manufactured by The Solvay Process Company

SOLVAY Calcium Chloride

FLAKE 77%-80%

Manufactured under United States Patents No. 1,527,121 and No. 1,592,971

THE IDEAL DUST LAYER AND SURFACE BINDER

PAVEMENT REPAIRS MADE EASY....

A new booklet... Write for it

It contains the latest information and approved modern methods on using a cold mix material for—

Surfacing
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Brick and wood block
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Play Safe

by using the new

GILSON

All-Angle Nozzle

Equipped with Back Pressure Hook

Gets a real fire stream into the difficult places the straight nozzle cannot reach.

With the Gilson All-Angle Nozzle you can get your stream on the fire without subjecting the men to unnecessary punishment. Used on ladder, the nozzle puts the water through the window right where it's needed, while the men direct it from a point below—where they are protected from the heat. In cellars, sub-cellars and in the holds of vessels it does its work equally well, with the men manipulating the direction of the stream from a point of safety above.

It's a nozzle you ought to have—write for further details.

F. H. LOVELL & CO.

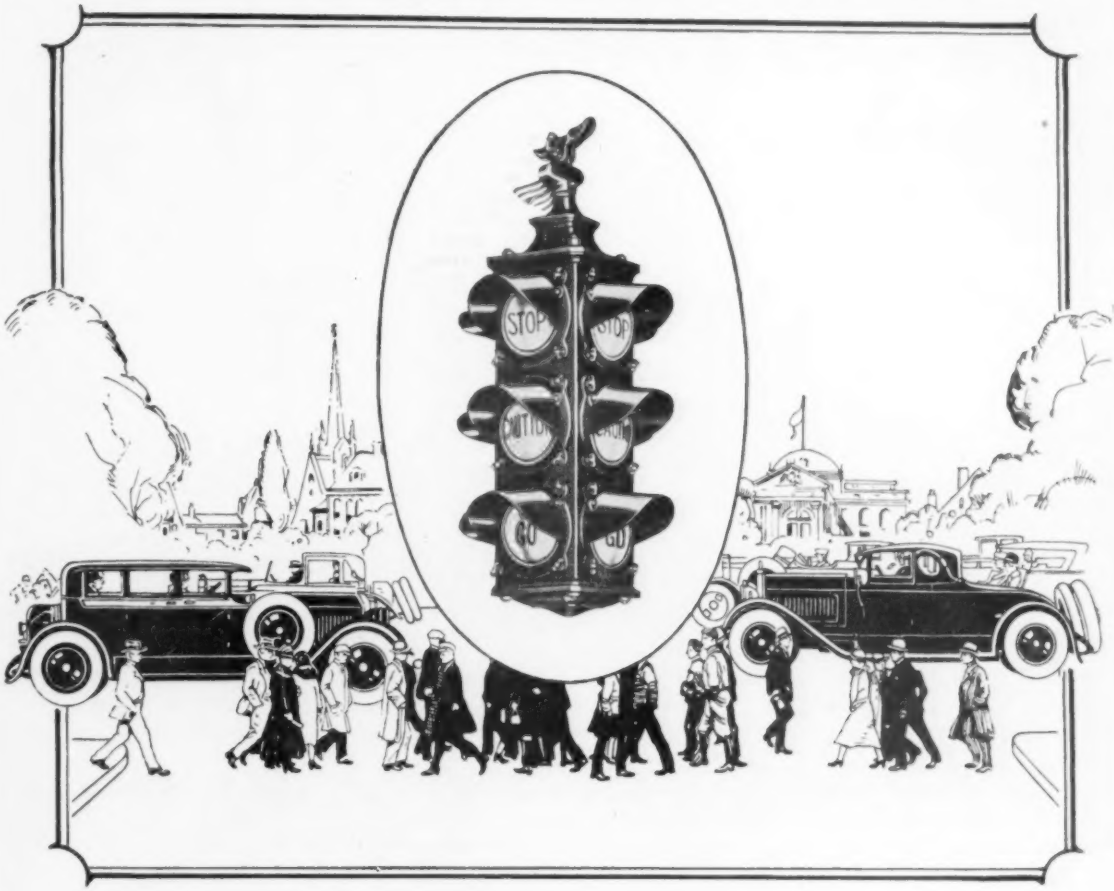
ARLINGTON, N. J.

DEALERS—Write for special proposition.

"I heartily endorse the Gilson nozzle. I have examined it very carefully and find it has many advantages in fighting fire where it is difficult to use the straight nozzle."

CHAS. H. GREENFIELD
Pres. N. J. State Fire Chiefs' Assn.

ELECTRIC TRAFFIC SIGNALS



In every city, no matter how large or small it may be, there are dangerous isolated intersections, outside of the congested area, which are heavily travelled and which need protection. There are so many of these that it is economically impossible to protect them by traffic officers, but they may be controlled effectively and economically by traffic signals.

Complete information will be sent upon request.

CROUSE-HINDS COMPANY

ESTABLISHED 1897

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YOUR DA-N-NITE PROBLEM SOLVED

DA-N-NITE STREET SIGN

AT LAST—a street sign that meets the requirements of traffic experts everywhere. The Da-N-Nite Street Sign is even more legible at night than during the day, and is readable from any direction. Designed to add beauty to the lamp post, yet strong enough to last indefinitely. Weather conditions have no deteriorating effect. Frames made of cast bronze or aluminum, sign panels are opal glass, with large black letters. Installation—simplicity itself. Designed to fit any style lamp post. Details on the last word in street signs gladly furnished.

R. F. MFG. CO.

Gatchell Da-N-Nite Street Sign

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A "Sign" of Better Government!

WHY do the better municipalities prefer JOSLIN New STREET SIGNS?

Because they reflect those municipalities' higher ideals of better government and improved civic appearances. Men, method and materials are the best here. This high standard of production is instantly recognizable in the JOSLIN New STREET SIGN.

Letters are pure aluminum, embossed. Background is finished in genuine Du Pont Duco. Rust-resistant metals such as aluminum, duralumin and toncan copper Molydenum iron are used throughout.

JOSLIN New STREET SIGNS present numerous recent improvements, which more than ever before place them in the front rank.

Desirable sales territories are still available to a limited number of PRODUCERS! Write us.

A. D. JOSLIN MANUFACTURING CO.
MANISTEE MICHIGAN

JOSLIN
Street Signs

FREE BOOK . . .
tells how to Improve Your City Streets

OFFICIALS responsible for the appearance of their city streets will be interested in the Premax Portfolio of House Numbering Systems.

Some of the subjects this booklet covers are: *Renumbering Cities or Sections of Them; Methods of Financing Numbering Projects; Advantages of Various Types of Numbers.*

EXCELITE
The attractive de luxe design under a clear glass cover

With each booklet we include samples of the different Premax Numbers. Fill out the coupon below and mail.

Premax Products, Inc., Niagara Falls, N. Y.
Please send me without obligation, your portfolio on House Numbering Methods.

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Tokheim CHRONOPLAN provides Speedy, Continuous Traffic Movement

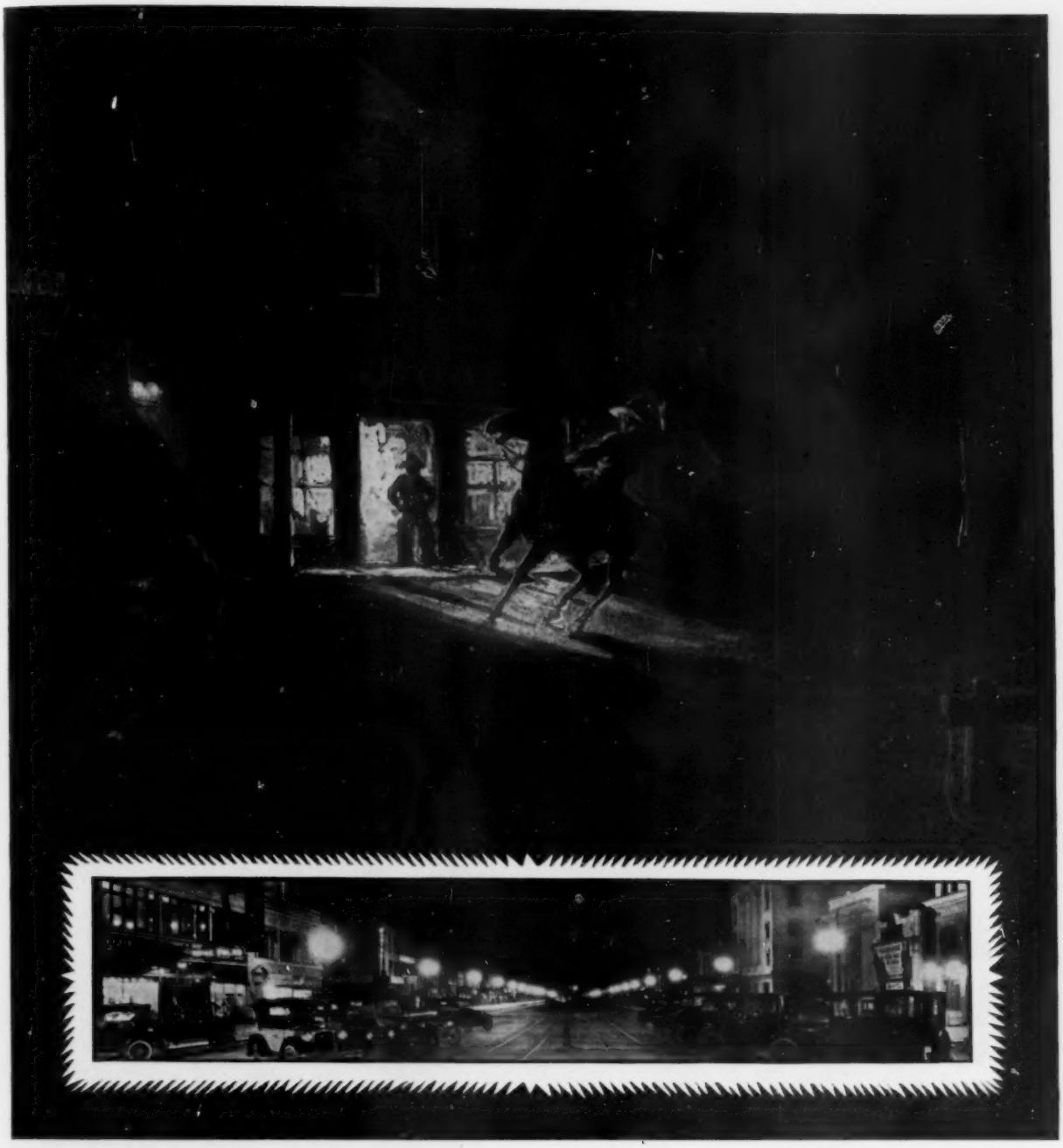
Wherever this system is installed it demonstrates its superiority in speeding up traffic movement. Traffic officials in Chicago, Detroit, Cleveland, Buffalo and many other cities will tell you that the *Tokheim CHRONOPLAN system increases traffic movement* 25% *to* 100% over other systems in use in the same cities.

An entirely new plan of timing, a wholly original mechanical design, a distinctively different electrical setup and better materials and workmanship all combine to give the Tokheim CHRONOPLAN system a greater traffic movement efficiency, wider flexibility to changing traffic conditions; lower operating and maintenance costs and a longer life of continuous service.

Traffic officials are invited to visit our plant, or to write for our interesting Bulletin 2000—a "liberal education in traffic control."

Cut 1500
Traffic Signal Timer

Tokheim Oil Tank & Pump Company
Fort Wayne, Indiana



OUR CITIES ARE COMING OUT OF THE LONELY PAST

—out of the gloom that made folks seek their firesides after sundown—into the glow and color and life of modern streets shining bright with modern street lighting! . . . Here are some of the striking effects of up-to-date street lighting installations as observed by progressive and practical civic officials: Generally increased property values. Fewer night traffic accidents. Stimulated trade. Evidences of awakened civic pride. Marked reduction in crime . . . But what *makes* modern street lighting? Candlepower? Spacing? Yes, these, and a dozen other considerations which Graybar—distributing as it does virtually *all* types of street lighting — is ideally equipped to discuss impartially.

GraybaR
STREET LIGHTING

DISTRIBUTORS OF KING FERRONITE CAST IRON STANDARDS
DISTRIBUTORS OF UNION METAL PRESSED STEEL STANDARDS

—COUPON—

Graybar Electric Co., Graybar Bldg., New York. *Gentlemen:* Please tell us what modern street lighting can do for our city.
AM. 4

NAME..... ADDRESS.....

ELRECO ...*the all-purpose pole ... in Akron*

AKRON, Ohio has adopted Elreco Poles as an indispensable aid to their street beautifying program. And naturally, too. For when Elreco Poles go up along the curb line, all the miscellaneous wooden and iron poles of different sizes and shapes can come down. Elreco serves all purposes.

On this strong artistic pole the trolley wires, the various lighting and commercial circuits, the brackets for lighting units, the traffic signals, and if need be even the telegraph cables and transformers can be accommodated. Truly, the all-purpose pole.

When you face a problem of modern street lighting you may be certain of helpful advice and intelligent cooperation from Elreco Engineers. Just write to either of the offices listed below.

THE ELECTRIC RAILWAY EQUIPMENT COMPANY
2900 Cormany Avenue Cincinnati, Ohio
New York Office: 30 Church Street

"One Pole for All Purposes"

ELRECO
POLES

When you write for that catalog, kindly mention THE AMERICAN CITY

The Motorist
stops, sounds horn, and obtains green light

The Pedestrian
stops, presses button, and obtains green light

Cross traffic operates its own signals

This new G-E signal control prevents unnecessary delays

WITH the new G-E traffic-operated control, the main street always has the green light unless there is cross traffic. No more stopping for the red—no more waiting for the green, unless there is a vehicle or pedestrian ready to cross.

However, traffic-operated control does not place the signal system entirely in the hands of cross traffic. Main-street traffic is interrupted only when necessary and then only for a short period of time. In case of an unusually large amount of cross traffic, the time allocated to main and cross streets is automatically balanced, and the signals continue to function in this manner until traffic again becomes normal.

Traffic-operated control is ideal for intersections on main highways and is the logical solution of the traffic problem at many intersections in outlying districts. Ask for detailed information.

G-E traffic-control specialists recommend the impulse system for business areas, the synchronous system for residential areas, and the traffic-operated system for outlying intersections. The nearest G-E sales office will submit complete recommendations for the solution of your traffic problem.

JOIN US IN THE GENERAL ELECTRIC HOUR, BROADCAST EVERY SATURDAY AT 8 P.M., E.S.T. ON A NATION-WIDE N.B.C. NETWORK

720-124

GENERAL ELECTRIC

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Where Traffic Cannot Be Interrupted

Mark Your Streets With Hanline Zone Paint!

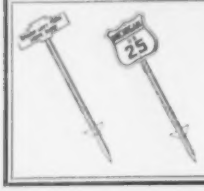
DRIES IN SIX MINUTES

No pick-ups—no tire smears—no blocking of traffic. In six minutes its pure white, semi-gloss finish is ready for the rush of tires. And it is absolutely oil- and water-proof. It's easy to apply. Hundreds of cities and towns from coast to coast—many large corporations and railways—use Hanline Zonepaint with unequaled success. In white, yellow, red and black—try it this year!

May we send you Descriptive Literature.

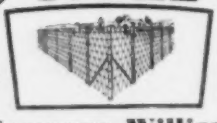
HANLINE BROS.

Baltimore, Md. *Paint Makers* Since 1848



SWEET'S STEEL POSTS

Made in our own rolling mills from Special high Carbon steel—

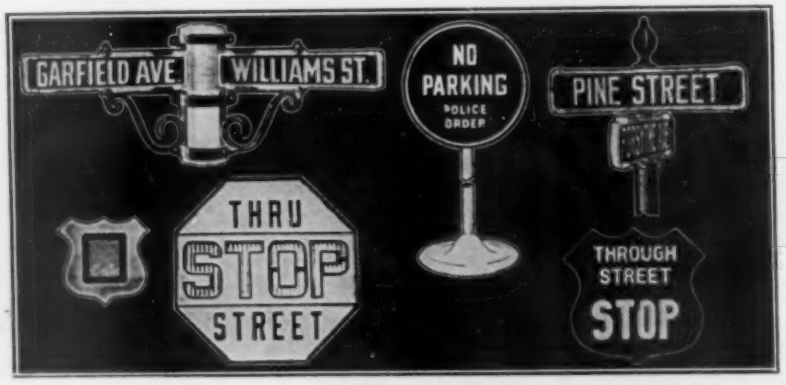


Strong, durable,—pleasing in appearance. *Write for descriptive folder.*

Sweet's Steel Company, Williamsport, Penna.

Do You Want Prices on Anything?

Readers of THE AMERICAN CITY desiring to secure catalog or price lists on any sort of machinery equipment or supplies for municipal or county work are invited to state their wishes to the Catalog and Price List Department, The American City, 443 Fourth Ave., New York. One letter to us will secure you the information you desire free of all charge, and at a considerable saving of time and correspondence.



WARNING!!

Nothing adds more to the attractiveness of city streets than Street Markers that combine artistic appearance with serviceability.

For dead ends, curves, crossings and dangerous places, the Holophane Reflector is the most practical.

UNION IRON PRODUCTS CO.

East Chicago, Indiana

ALUMINITE SIGNS

To Mark Streets and Direct Traffic

ECONOMICAL
EASY TO READ
BEAUTIFUL
PERMANENT

Installation of Aluminite Signs throughout the country proves their outstanding worth. Many exclusive features are fully described and illustrated in our catalog which will be sent on request. A card will bring it—with full details of our engineering service in street marking.

STANDARD MANUFACTURING CO.

Cedar Falls, Iowa

WHERE AM I, MISTER?

How often is that question asked in YOUR city, not only by strangers in town, but by your own citizens living in other sections? And all because your streets are not properly marked!

Our latest development in street signs will allow you to erect them on every corner. Write for particulars.

A four-way porcelain enamel sign, in aluminum holder, ready to mount on 2-in. post, complete, in reasonable quantities 6.50

ROCHESTER STREET SIGNAL CO.

400 Ward Bldg. Rochester, N. Y.

1800 conversations at once through a cable less than 3 inches thick

An Advertisement of the
American Telephone and Telegraph Company

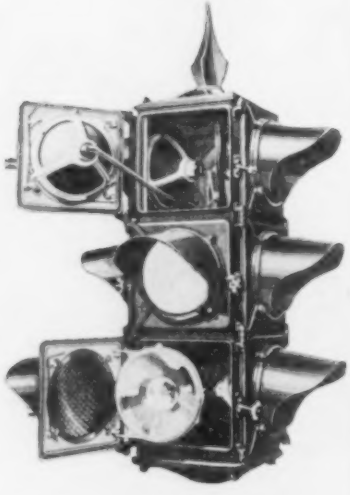
THE earth beneath our great cities is crowded. Steam, gas, sewer and water-mains, compressed air pipes, pneumatic tube systems, telephone and telegraph cables, light, power and rapid transit conduits lie so close together that any further additions create serious engineering problems. Yet the number of telephone calls that must flash through the underground arteries of great cities is steadily increasing.

The challenge to the scientific minds of the Bell System was to find a way for more conversations in existing conduits. Fifteen years ago, the pride of the System was a cable containing nine hundred pairs of wires. Then by many improvements a cable of twelve hundred pairs was perfected. It was rightly considered a scientific triumph.

Today, cables containing eighteen hundred pairs of wires are in service and these cables with every wire insulated are only two and five-eighths inches in diameter, one-half as large as the first nine hundred-pair cable. Eighteen hundred conversations at once—six hundred more than before—can now pulse through this two and five-eighths inches of cable.

There is no standing still in the Bell System. Better and better telephone service at the lowest cost is the goal. Present improvements constantly going into effect are but the foundation for the greater service of the future.

"THE TELEPHONE BOOKS ARE THE DIRECTORY OF THE NATION"



A few of the many Horni Traffic Signals carried in stock for immediate delivery.

We are pioneers in this industry and are prepared to solve your most difficult traffic problems.

Descriptive literature furnished on request.

HORNI SIGNAL MANUFACTURING CORP.
515-521 Greenwich Street
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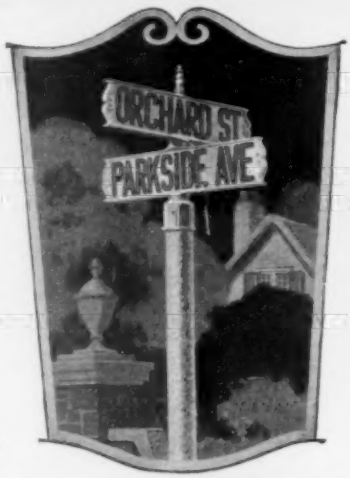
ALUMOYD'S NEW DE LUXE STREET MARKER

A NEW IDEA IN CAST ALUMOYD SIGNS — ORNAMENTAL — EXCLUSIVE — DISTINCTIVE — BEAUTIFUL



NOW THERE ARE FIVE DIFFERENT STREET SIGN MODELS IN THE ALUMOYD LINE

A SIGN FOR EVERY BUDGET

ALUMOYD — the name that signifies sign perfection—specify it

ALUMOYD SIGN & SIGNAL CO.

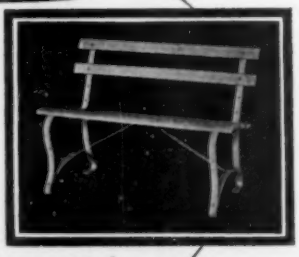
Manufacturers Exclusively of
Municipal Signs and Signals

255-59 EAST 95th ST. CHICAGO, ILL.

Write for Representative Proposition

Logan Settees
LOUISVILLE

Made for hard usage, long life and real comforts in many styles for every conceivable purpose. Big-volume production means lowest possible prices. Write today for descriptions and price list.



LOGAN CO., *Incorporated*
(Formerly The Dow Co.)
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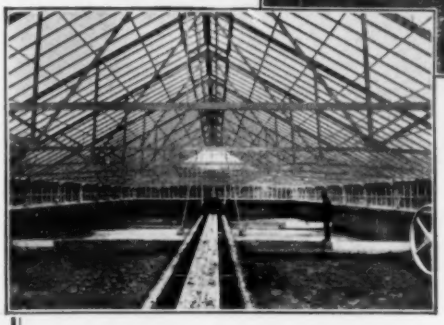
Managing Director

Sewage Disposal Plant, Dumont, N. J., showing the 2 King Steel Frame Sludge Bed Enclosures recently completed. Below—interior of one of the King Enclosures. Thos. F. Bowe, Engineer, New York City.



Now, even a Sewage Disposal Plant can be ATTRACTIVE and EFFICIENT

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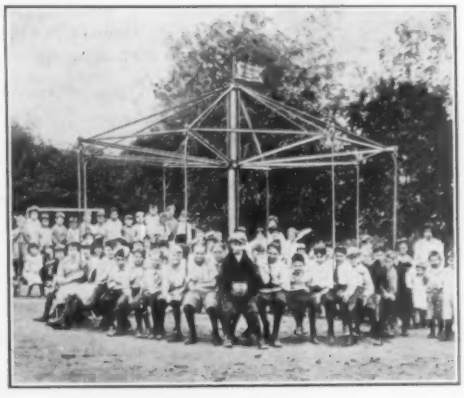

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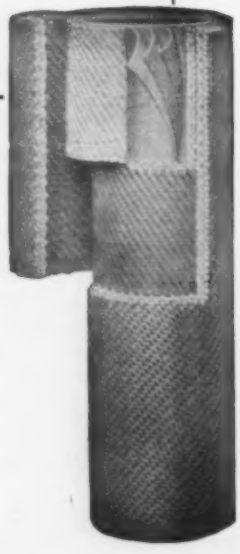

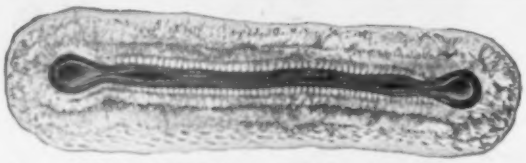

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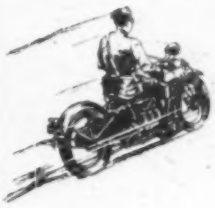

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Low center of balance and low saddle position. Your officer can maintain his speed at corners.

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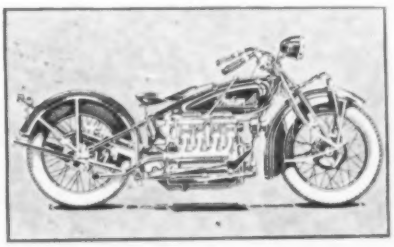

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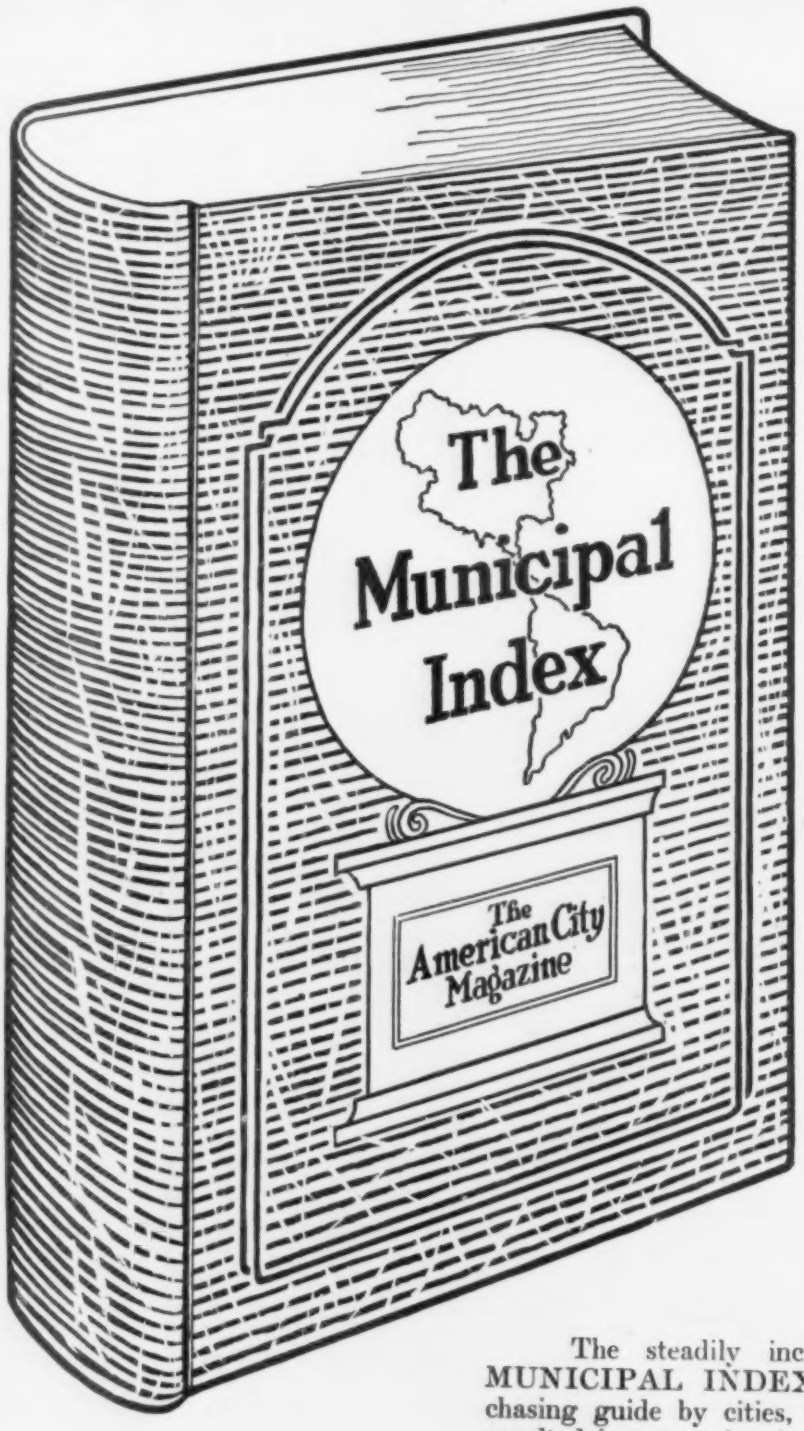

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IN 90% OF AMERICAN DEPARTMENTS

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FIRE DEPARTMENT
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American La France & Foamite Ind.Inc.
Denver,Colo.
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This car has responded to over 5000 alarms and is still answering all first alarm fires out of our Central Station,and from all appearance will last 18 years more.during this time the car has received only one general overhauling and then only minor replacements were necessary (The bill being $22.80) for parts.
We believe this record is a perfect score.
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Battle-scarred from more than 5,000 engagements with fire—but still, after 18 years of gruelling service, answering every first alarm!

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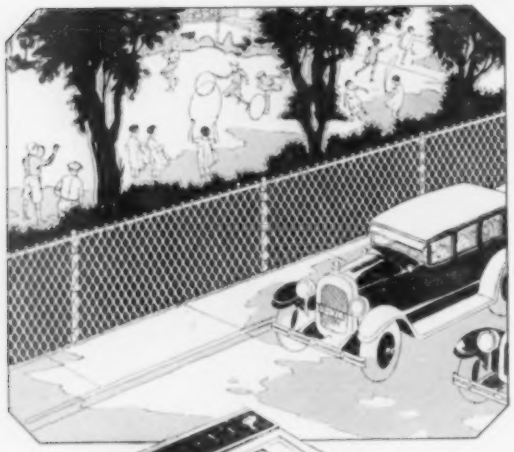

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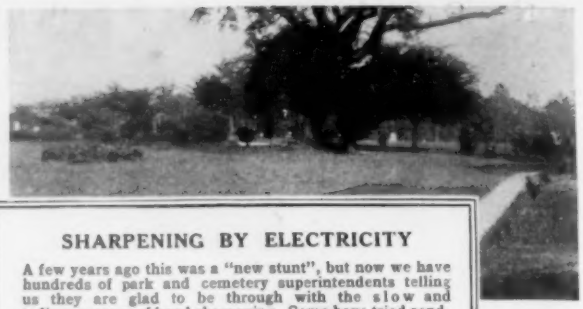

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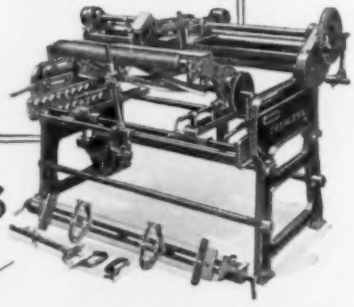

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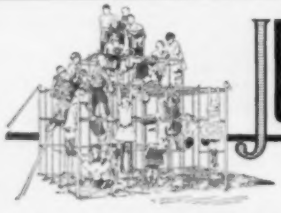

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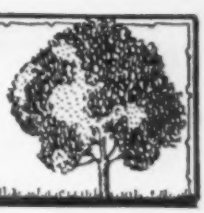

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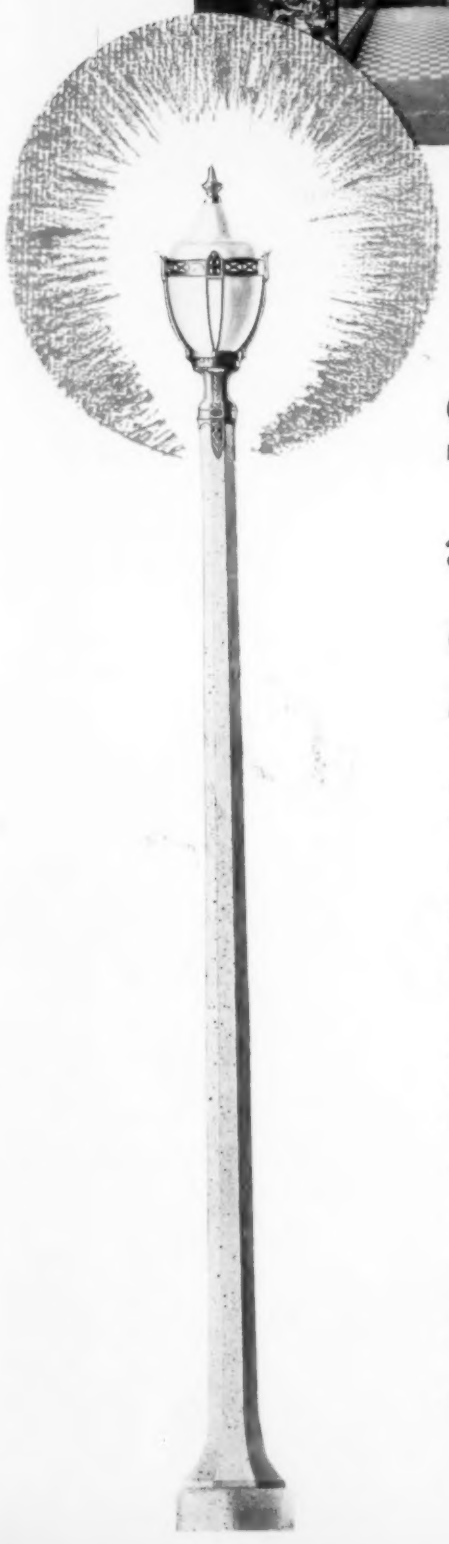

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